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A GOLDEN **EXPLORING EARTH** BOOK

ANIMALS

Contents

The Animal World 3
Egg-laying Mammals 5
Mammals With Pockets 6
The Insect Eaters 8
Flying Mammals 9
The Clever Mammals 11
The Toothless Mammals 15
The Gnawers — Rodents 16
Rabbits and Hares 21
Sea-dwelling Mammals 22
The Flesh Eaters 25
Sea-dwelling Carnivores 32
Elephants 34
Sea Cows 35
Odd-Toed Hoofed Mammals 36
Even-Toed Hoofed Mammals 40

A GOLDEN **EXPLORING EARTH** BOOK

ANIMALS

Mammals from all over the world—huge whales, night-flying bats, moles that tunnel underground, bears, tigers, elephants, and monkeys—fascinating facts about these and over 200 other animals

By George S. Fichter **Cover by Rod Ruth**

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THE ANIMAL WORLD

All of the animals in this book are mammals, the large group to which such familiar animals as dogs, cats, horses, rats, mice, and, of course, man belong. They all share basic characteristics.

All mammals have a high body temperature. In contrast, the body temperature of other animals, such as reptiles and amphibians, varies with the temperature of their surroundings. Birds also have a high, regulated body temperature, but a bird's body is covered with feathers. Mammals have hair on their body—and they are the only animals that do have.

Most kinds of mammals have hair over the entire body, but some have only a scattering here and there or are nearly hairless. However, all mammals do have hair in at least some stage of growth.

Mammals feed their young on milk that is secreted from the female's mammary glands. It is this distinctive feature that gives the group its name.

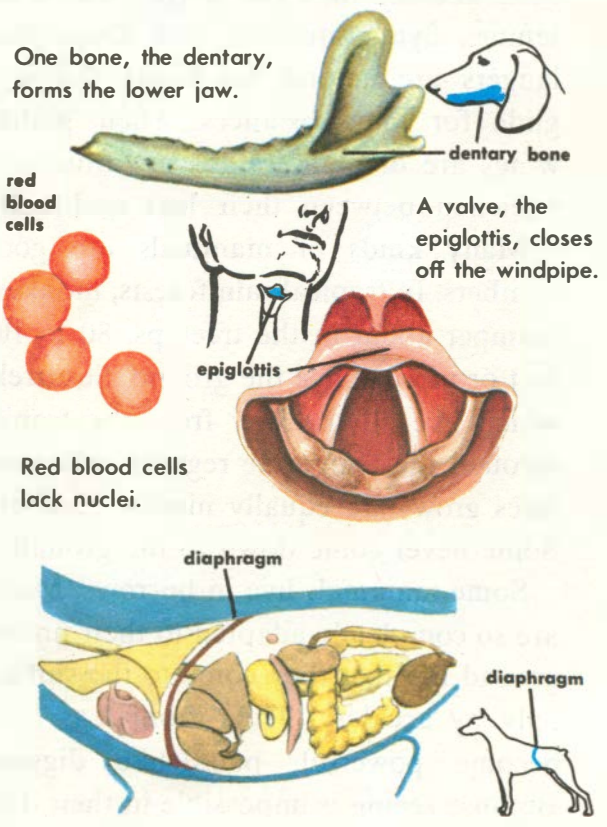
Biologists sometimes list additional characteristics that make mammals different from other animals. A mammal has a single, solid lower jawbone that is formed by the joining of several smaller bones. A mammal has red blood cells that lack nuclei, and a sheet of muscle, called the diaphragm, separating the lung cavity from the other internal organs. Flexible pieces of cartilage, a tough tissue, form the epiglottis, which closes off the windpipe.

Nearly all mammals have just seven vertebrae in their neck. This includes the long-necked giraffes, which stand as tall as 18 feet, as well as whales and porpoises, which appear to have no neck at all. In a mammal's middle ear, there are three bones—the stirrup, anvil, and hammer—that transmit sound waves to the inner ear. Most mammals have sweat glands that release a watery excretion from the skin and help to keep the animals cool. Nearly all mammals also have a system of oil glands that provide lubrication for the skin and hair.

Most of these features are internal—that is, inside the animal, hence not easily observed. It is generally easiest to say that any hairy animal is a mammal. The exceptions—those with little or no hair—are few.

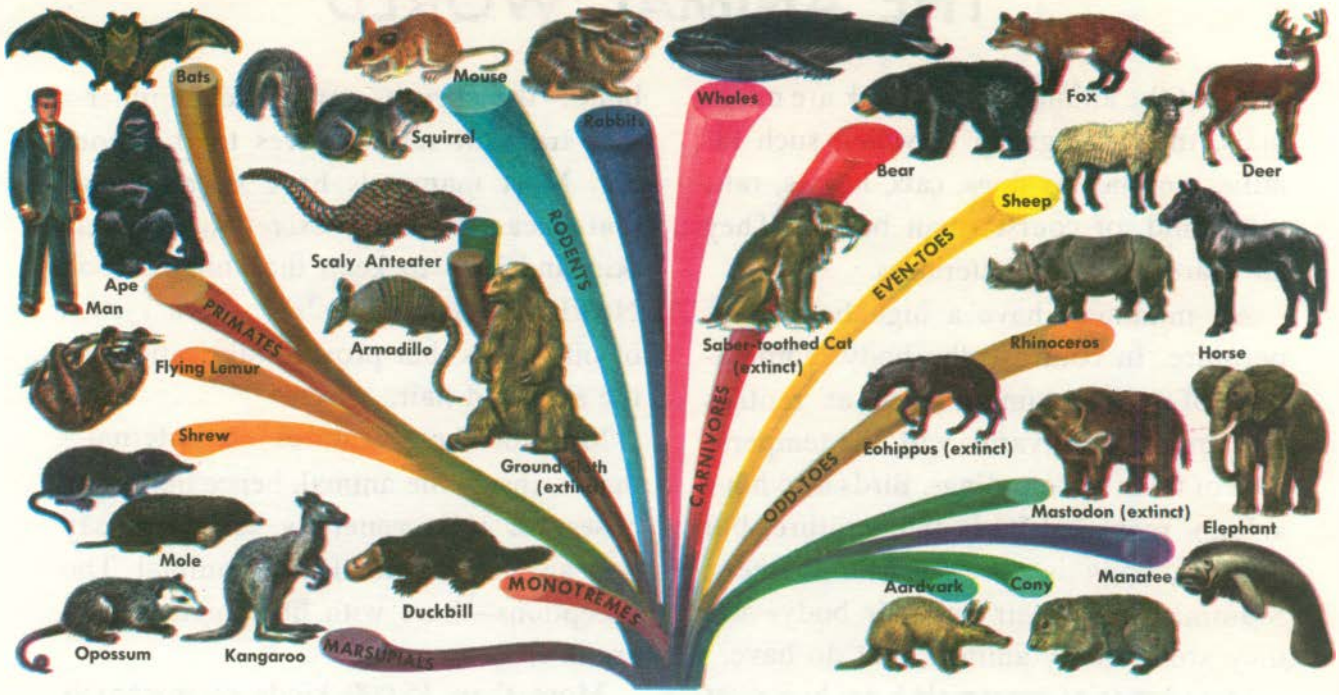
More than 15,000 kinds of mammals inhabit the earth. They range in size from tiny shrews and bats that are less than two inches long to the gigantic whales that weigh as much as 100 tons. These

Some internal characteristics of mammals



A muscular sheet, the diaphragm, divides the body cavity.

FAMILY TREE OF MAMMALS



many kinds of mammals live everywhere on earth. They exist in such widely varied places as arctic waters and the hot, dry sands of the desert.

Bats are the only truly "winged" mammals and are thus able to fly. But flying lemurs, flying squirrels, and flying phalangers are among the kinds that can glide for long distances. Their gliding wings are of membrane, very thin skin, stretched between their legs and body.

Many kinds of mammals are good climbers. In tropical rain forests, monkeys scamper about in the treetops, 80 to 100 feet or more above the ground. Squirrels, which live all the way from the tropics through the temperate regions—wherever trees grow—are equally nimble climbers. Some never come down to the ground.

Some mammals live in burrows. Moles are so completely adapted to their underground life that they come to the surface only by accident. Their front legs have become powerful, paddlelike diggers. Because seeing is impossible in their dark world, the eyes of most moles are very small and able only to distinguish light from dark. Many other kinds of mammals spend most of their lives in burrows, coming out only to find their food.

Whales and porpoises have become totally aquatic. Their front legs are finlike flippers and their hind legs mere bony remnants that are not even visible externally. Their body is torpedo-shaped, like a fish's. This enables them to pass through the water with the least resistance.

Seals, walruses, otters, and a few other kinds of mammals are only slightly less well fitted for life in the water. Some have flippers, some webbed feet, and they either lack coats of hair or have short hair that fits tightly against their body. The hair is oiled by glands in the skin, giving it waterproof qualities.

Typically, mammals have four legs—never more than four—and they live on or near the surface of the ground. On kangaroos, the front legs are very small, but the hind legs are exceptionally large and powerful, for jumping. Some of the small desert rodents also have strong hind

legs built for jumping, and they look much like kangaroos.

In winter, some kinds of mammals hibernate. Their body temperature falls to much lower than normal, and their breathing and all other body processes are slowed down. In this way, using less energy, the hibernator survives a period when food is scarce. Woodchucks, some kinds of shrews, bats, and ground squirrels are among the kind that truly hibernate. Bears do not really hibernate in winter. They only sleep for long periods of time.

Mammals are considered to be the most highly developed of all the animals. This is because of their well-developed brains, which help them to understand their surroundings. With this better thinking equipment, mammals are able to "figure out" what to do in various circumstances, and they can remember what to do from similar happenings in the past. They can acquire knowledge and use it in their living. This is truly the greatest distinction of mammals in the animal kingdom, and it has made them the ruling animals on earth today.

Egg-laying Mammals

These strangest and most primitive of all the mammals actually lay eggs—eggs with thin, rubbery shells, like those of a snake or a turtle. They are the platypus and two kinds of spiny anteaters, or echidnas. They are found only in Australia and on New Guinea and nearby islands, where they are now protected by law.

The platypus lives in burrows along the banks of ponds and streams. It has a short, broad tail and webbed feet for swimming. The platypus feeds on worms and grubs that it roots from the mud with its flat, ducklike snout. In an underground nest lined with leaves and grass, the female lays her eggs and then holds them close to her body to incubate them. When the young are born, they lap up milk that seeps into hairy pockets on the mother's underside.

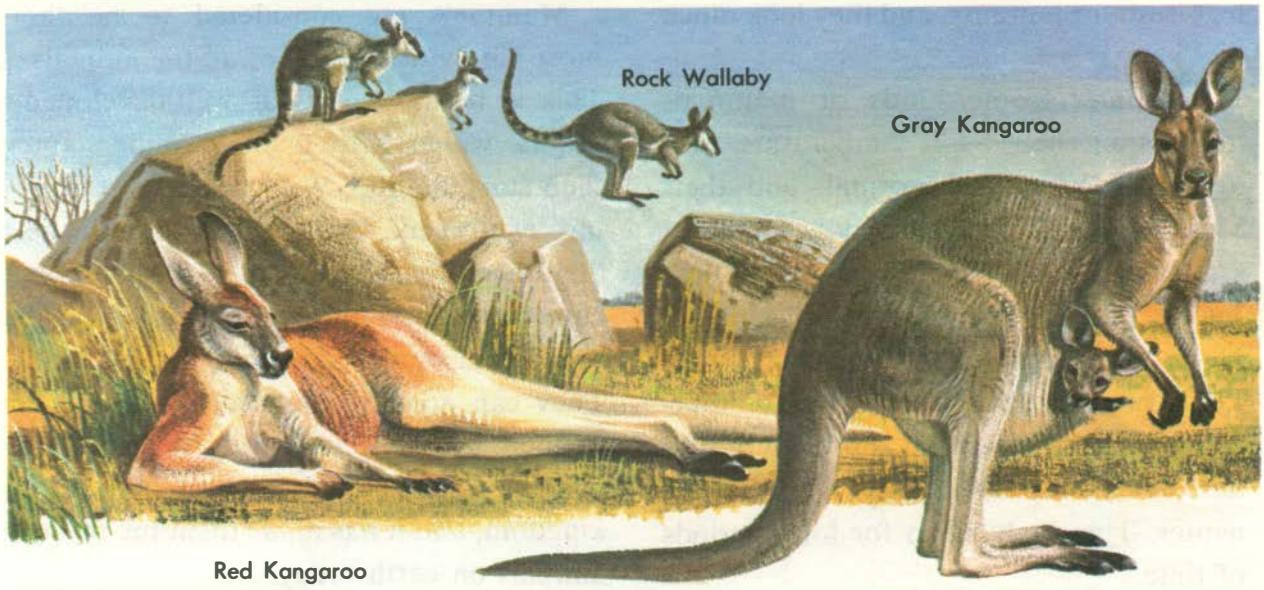
Echidnas, or spiny anteaters, are land dwellers. The female lays one egg in a pouch on her belly. The young stays in the pouch, nursing, until it becomes too prickly for the mother to carry it in comfort. It is then forced outside to live on its own.

Platypus

Echidnas, or Spiny Anteaters

incubating eggs

feeding young



Mammals With Pockets

Kangaroos are among the best known of all animals—and everybody knows that the mother kangaroo carries her young in a pouch on her stomach. Young kangaroos are called "joeys," and they ride in their mother's pouch until they are about six months old.

Kangaroos and the closely related wallabies are only slightly less primitive than the egg layers. They form a special group called marsupials, or pouched mammals. Most of them live in Australia or on nearby islands.

The red and the gray kangaroos are the giants among the marsupials. They may stand seven feet tall and weigh more than 200 pounds. They can travel at a rate of 25 or 30 miles an hour, sometimes leaping 20 feet in a single bound.

Most of the wallabies are about the size of rabbits. Some have developed special physical characteristics to fit their way of life. Rock wallabies, for example, have extra-thick footpads that help to prevent slipping when the wallabies leap from rock to rock.

Of the great variety of pouched mammals, many of them resemble other kinds of mammals that live elsewhere in the world. Tasmanian wolves are pouched mammals that look like dogs or wolves. Marsupial cats are spotted or striped and look like skunks. Tasmanian devils, not nearly as ferocious as their name sounds, are three-foot-long bearlike marsupials that have a look much meaner than their disposition. Their most "devilish" feature is their howling, yelling, groaning growls.

A great many marsupials are not much larger than mice and are like them in habits. Still others are burrowers, like moles. Phalangers are excellent climbers and gliders, like the flying squirrels of North America. Wombats are about the size of badgers, and, like badgers, they dig burrows with their powerful front legs. Koalas, about the size of the cuddly teddy bears they resemble, feed exclusively on the leaves of eucalyptus trees, which makes them difficult to keep in captivity.

Millions of years ago, the marsupial mammals were apparently much more

widely distributed in the world. They were not able to compete successfully with the more highly developed mammals, however, and so they survived in numbers only in the isolation of the Australian region.

In the Americas, the only marsupials are the several kinds of opossums. The common opossum of North America is familiar to almost everyone. Few people have ever seen newborn opossums, however. Like the young of other marsupials, they are small and undeveloped at birth. The opossum's newborn are not much larger than bees. They crawl feebly along a slime track and into the mother's pouch. In the pouch, each fastens itself to its mother and begins nursing. It is a month later before the young have completed their development and can move about on their own. For still another month, the young opossums nurse, now using the pouch as a place in which to hide.

All of the opossums in the Americas have a scaly, hairless tail that they use as an aid in climbing. Out of the pouch, the young opossums usually cling to the mother by wrapping their tails around hers. When frightened, the common opossum "plays dead," lying motionless until danger has passed. Biologists tell us that opossums may have little or no control over this reaction and that they may actually go into a state of shock in the presence of danger.

The Insect Eaters

Nearly all of the mammals in this group are small—no larger than rats or mice. They are widely distributed, but they are secretive animals that stay out of sight and out of man's way.

Tiny shrews are abundant but seldom seen. Most of the many kinds live in leaf litter or in loose soil. Often they prowl along mouse runs or mole burrows. Extremely active creatures, they burn energy so rapidly that they must eat constantly to keep from starving to death.

A shrew's normal fare is insects, but it will fearlessly attack animals twice its size, if necessary. Some have a poisonous saliva. The strange elephant shrew of Africa has an exceptionally long snout; it also has large hind legs on which it hops about like a kangaroo. Water shrews are not only good swimmers but are also able to scamper across the surface of water. The smallest shrew measures less than an inch and a half long and weighs only about a tenth of an ounce.

A mole's front legs are broad, flat, powerful paddles with which the animal plows through the soil. Moles live in deep underground chambers, but they may dig temporary burrows close to the surface in order to feed on grubs and worms found around the roots of plants. In this process, unfortunately, they often upset tender young plants. The unusual star-nosed mole has a cluster of fleshy, sensitive feelers around the tip of its snout.

European hedgehogs, six to ten inches long, roll into a ball when frightened, tucking their head and feet inside the spiny enclosure. Insects, worms, and other small animals are their principal food, but they are known also to eat snakes. The slightly larger tenrec, of Madagascar, is a hedgehog, too.

Hedgehog

Tenrec

Short-tailed Shrew

Water Shrew

Star-nosed Mole

Common Mole

Flying Mammals

Bats are the only mammals capable of true flying. Their wings are thin membranes of skin stretched between their long fingers and their body and, in some kinds, also between the tail and the body. Only their clawed thumbs are free and movable.

Bamboo bats, of southeastern Asia, measure only about an inch and a half long. They are nearly the smallest of all the mammals. Giant flying foxes, in contrast, have a wingspread of about five feet. Some bats are pug-nosed and have grotesquely wrinkled faces. Others possess long, pointed snouts, much like mice or rats. Some have long, barbed tongues for dipping into flowers to get nectar; others have razor-sharp cutting teeth. Some have neat, rounded ears; in others, the ears are almost twice the size of the head. Altogether, there are about 2,000 different species, ranking this group next to the rodents in the number of different kinds of animals.

Most bats feed either on insects, nectar, or fruit. The insect eaters are generally pug nosed, while the fruit eaters have long noses and long tongues. Some kinds of bats have very special diets. The fish-eating bats of tropical America, for example, skim the surface of lakes and streams to pick up small fish. Vampire bats, also of the American tropics, eat only blood. They can slit the skin and lap up the blood as it oozes out, without even waking their victims, which are usually livestock but sometimes humans.

Bats are active at night or during the dusky hours of twilight. They use their remarkable natural radar system to navigate in the dark. Bats make easily heard squeaking noises, like mice. In flight, however, they also give off, in a pulsating rhythm, high-pitched sounds that are beyond the hearing range of the human ear. When these sound pulsations hit objects, they echo back and are picked up by the bat's sensitive ears. Some bats have peculiarly enlarged noses with many leaflike segments. These pockets are believed to serve in picking up sounds.

Vampire Bat

With this system of echo location, a bat can tell what lies ahead. No one

knows how the bats determine which of these echoes come from objects they should avoid and which come from insects or other food. The bats do know, however, and will deftly twist or turn to keep from hitting some objects, while swooping in close to pluck an insect off a leaf or out of midair. Bats are not blind, but in most species, the eyes are small and do little more than distinguish light from dark. During the day, bats sleep hanging head down in caves and barns and abandoned buildings.

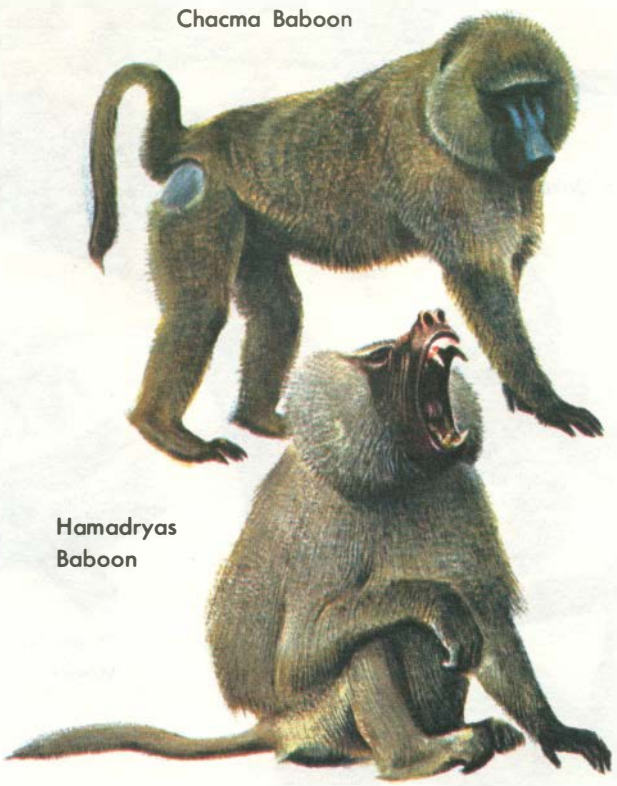
Bats that live where the winters are cold either hibernate during the winter or migrate southward. Hundreds of thousands of bats assemble in some of the large caves. Their droppings (guano) become an important source of energy in the life cycles of other small animals living in the cave. They depend on them for their survival.

The Clever Mammals

Monkeys, apes, baboons, gorillas, and man belong to a group of mammals called the primates. The name suggests that these are the prime, or top, animals. In one important respect, they do rate this position, for primates are the most intelligent of all the animals. They have the best-developed brains. Except for man, all of the primates live in the tropics or the subtropics, and most of them are tree dwellers.

The most primitive of the primates are the lemurs, tarsiers, and lorises. All of them are climbers, with thick coats of hair and exceptionally large eyes.

Though they were once much more widely distributed, the lemurs now are found only on the island of Madagascar. They sleep during the day, becoming active at night to hunt for their food. They eat mainly insects and fruits but will also take birds or other small animals occasionally. The ring-tailed lemur is easily recognized by its long tail banded with black and white. It lives in the rocky, treeless areas on the western part of the island. All of the other lemurs are forest dwellers. These include the aye-aye, which has a bushy, squirrellike tail. The aye-aye also has rodentlike front teeth, for gnawing, and unusually long, slim, clawed fingers. It is said to tap the branches of trees with these wiry fingers to locate insects inside. It then probes with its slim middle finger to pull the larvae from their tunnels.



Chacma Baboon

Hamadryas Baboon

Ring-tailed Lemur

Aye-aye

Slow Loris

White-eared Marmoset
Howler Monkey
Rhesus Monkey
Red Uakari
Proboscis Monkey
Barbary Ape
Diana Monkey
White-throated Capuchin
Spider Monkey
Mandrill

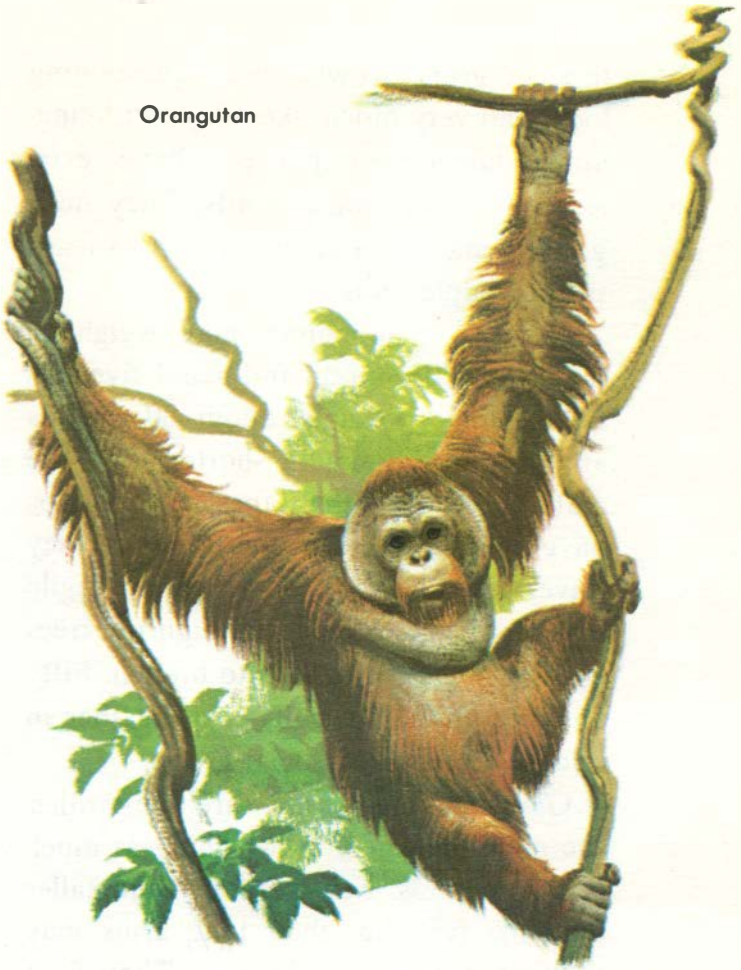
Lorises, which live in southeastern Asia and on the offshore islands, are the most sluggish of the primates. The slow loris creeps along branches, eating fruit, leaves, or insects that come within its reach. These shy animals rarely come down to the ground.

Baboons, the largest of the Old World (African and Asian) monkeys, are among the few primates that have adopted the habit of living on the ground. All of the half dozen or so species have long, almost doglike snouts, which apparently give them a better sense of smell than most primates, and bare faces.

Baboons travel in small groups, generally with a young male in command. They fight as a group to defend themselves from attackers. They eat mainly insects but will sometimes raid crops of fruit or vegetables, occasionally becoming pests near settlements. On the other hand, they are intelligent and can be trained to do simple chores, such as running errands or harvesting some kinds of crops.

Old World monkeys, those of Africa and Asia, characteristically have nostrils that are set close together, opening downward. In the proboscis monkey, the snout literally droops over the animal's mouth. In Old World monkeys, the tail may be either short or long, but it is not used for grasping. Among the common kinds of Old World monkeys are the guerezas, guenons, mangabeys, mandrills, and macaques. The rhesus monkey is a macaque widely used in medical research. Because of their fun-loving ways, rhesus monkeys are often seen in zoos.

Monkeys of the New World, those of South and Central America, have a long tail that they use to help them in climbing. Their nostrils open to the front



Orangutan

(or sides), rather than downward. Among the many different kinds are the howlers, spider monkeys, capuchins, uakaris, and marmosets.

The most manlike of the primates are the apes. Some of the different species live in Asia, others in Africa. Orangutans are apes native to southeastern Asia. They have very long arms. In fact, their arm spread may measure almost twice the height of the animals. Orangs have stocky bodies, some of the males weighing as much as 200 pounds. Among the most intelligent of all the primates, orangs are easily trained.

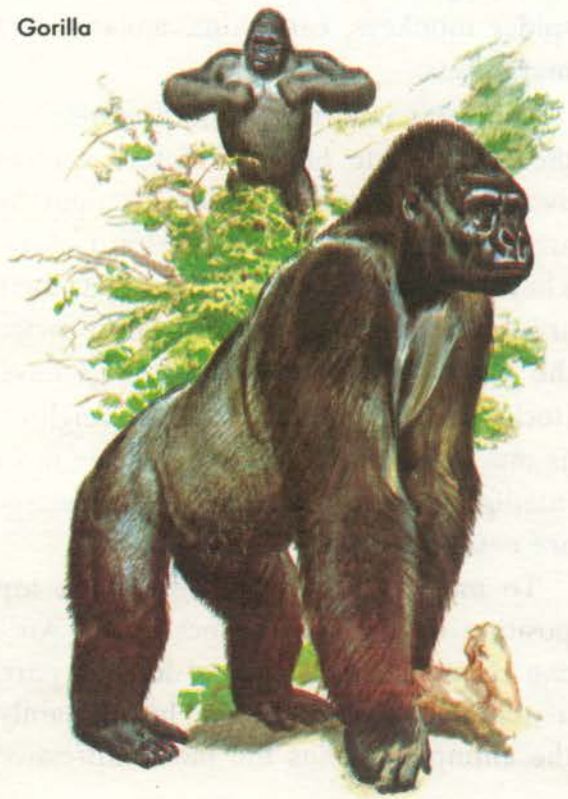
To most authorities, however, the top position in intelligence goes to the African chimpanzee. This is, at least in part, a matter of interpretation, but certainly the chimpanzee has the most expressive

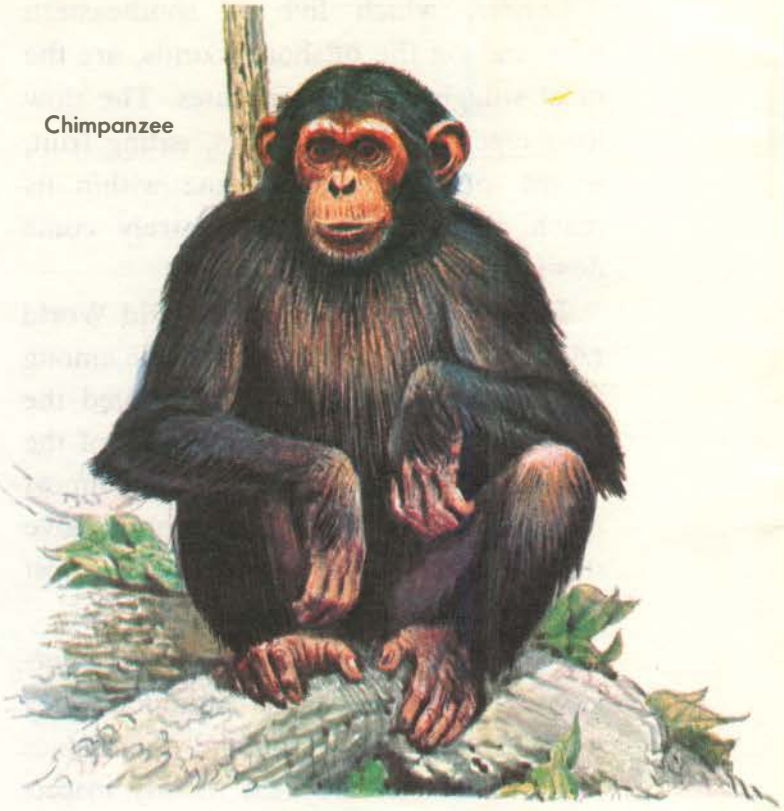
face. It grins, scowls, gives questioning looks—all very much like a human being. Some tamed chimpanzees have even learned to say single words. They have good memories, and they can also learn to use simple tools.

A large male chimp may weigh as much as 120 pounds and stand five feet tall. A female weighs about 80 pounds and is proportionately shorter than the male. Like the other apes, the chimps have long arms. On the ground, they travel on all fours, but they are agile climbers and can move through the trees by swinging from branch to branch. Fifty or more animals usually live together in a loosely organized social group.

Giants among the apes are the gorillas, the males occasionally weighing as much as 600 pounds. Few gorillas stand taller than 5½ feet, but their long arms may span as much as eight feet. They feed mainly on fruits and the juicy, soft parts of many plants.

Gorilla





Chimpanzee

If angered, a gorilla has literally no match in the animal kingdom, for it combines large size and great power with extraordinary cunning. Left alone, a gorilla is quite peaceable.

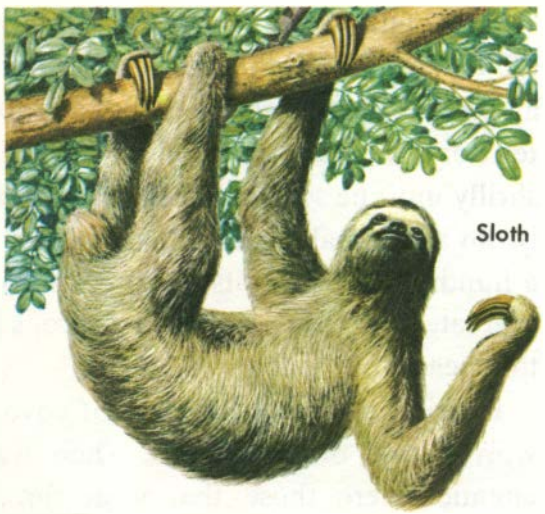
Gorillas live in family groups that consist of a male, one or two females, and their offspring. The usual group consists of a dozen or more animals. By day, they wander over the countryside, hunting for food; at night, they sleep among the low branches of trees or on the ground. In recent years, researchers have spent much time living with gorillas, learning their ways of life and how their groups are organized.

Gorillas are the rarest of the apes. Fewer than 10,000 of the animals are believed to exist. All live in Africa, along the equator, one kind in the mountains and another kind in the forest lowlands. In the wild, gorillas are thought to have a life-span of up to 50 years.

The Toothless Mammals

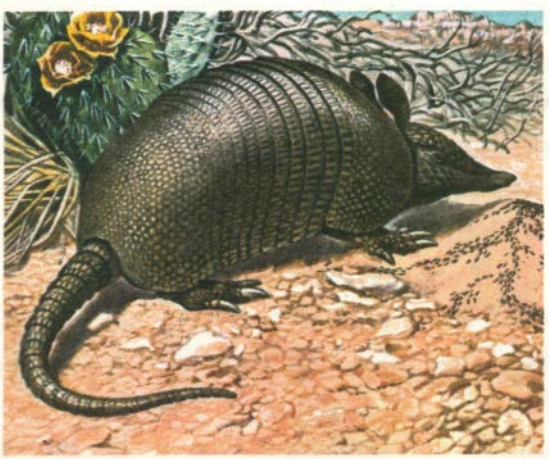
Sloths, anteaters, and pangolins (scaly anteaters) are unique among mammals in having either no teeth or fewer teeth than other mammals. Armadillos also belong to this group, although some kinds have many small teeth.

Anteaters walk with the enormous claws on their front feet turned under. They use these powerful "tools" to rip apart logs or mounds to get at the ants or termites inside, collecting the meal on their long, sticky tongues. The anteaters of Central and South America are hairy animals. Pangolins, the anteaters of Africa and Asia, are covered with scaly plates, much like the armadillos.



Sloth

Armadillo



Sloths, most sluggish of the mammals, hook their long, curved claws over a limb and hang from it upside down. In this same position, they move along the branch at a very slow pace. Found only in the American tropics, sloths turn green in the rainy season, due to the heavy growth of algae in their hair. A ground-dwelling sloth, now extinct for a million years, was about as large as an elephant. Living sloths are only about two feet long.

Armadillos are covered with scaly plates much like a turtle's shell. Here and there between the plates are bristly hairs. Some armadillos roll into a ball to evade intruders. They can tuck all of their soft parts out of sight. One kind ducks into a burrow and then plugs the entrance with the thick plate over its tail. The nine-banded armadillo of Central America and southern United States gives birth to quadruplets. The young armadillos have a soft skin. Two or three months pass before they get their very hard plates.

Giant Anteater

Pangolin

The Gnawers—Rodents

Rodents, or gnawers, are the most abundant of all the mammals. More than 6,000 species inhabit the earth. A rodent's chisellike front teeth never stop growing. They are kept sharp and worn down as the animal gnaws on stems, roots, nuts, or other objects.

All of the many kinds of tree squirrels form a special family of rodents that are especially skilled at climbing. The bushy tail serves as a balancer and as a rudder for steering when they leap from tree to tree. Like other rodents, squirrels store hoards of food. They bury nuts in the leaves and humus on the forest floor or tuck them into the hollow pockets behind roots. Often they forget where they hid them. This is one of the ways by which new crops of trees are started in forests. Flying squirrels, though they do not actually fly, have a thin membrane between their front and hind legs, and, with this membrane stretched wide and tight, they can glide for hundreds of yards, from tree to tree. Flying squirrels of North America are small, graceful creatures only six to eight inches long. The giant flying squirrels of Asia may be as much as three feet long.

Chipmunks, gophers, ground squirrels, prairie dogs, marmots, woodchucks—all are ground-dwelling members of the squirrel family. Some are solitary; others live in groups. Of these, the best-organized communities are those of the prairie dogs of North America.

At the peak of the prairie dog population, their "towns" contained many thousands of individuals. One prairie dog town was estimated to have covered about 30,000 square miles.

Fox Squirrel
color variations

Each family of prairie dogs marked off its space needs in the prairie, and if an errant animal wandered into the wrong territory, he was promptly whistled at shrilly until he scurried back home. Rarely did an animal venture much more than a hundred feet from its burrow, for going a greater distance was too dangerous for this peaceable rodent.

Prairie dogs were the prey of coyotes, wolves, and other animals. Their worst enemies were those that went directly into their burrows. These were the black-footed ferret and the badger. They were also preyed upon by the prairie falcon, which swept down from the sky, and by the burrowing owl, which frequently took over their burrows.

Their most dangerous foe was man. The burrows of the prairie dogs were a menace to man's horses, which stepped into the holes and broke their legs. The burrows and mounds were not good, either, for land that was to be plowed.

Flying Squirrel

Gray Squirrel

Prairie Dog

Woodchuck

So, by hunting and by poisoning, the prairie dogs were steadily reduced in numbers. Now they are found only in limited sections of the western plains. The animals that lived with them and preyed on them have disappeared, or are disappearing, too.

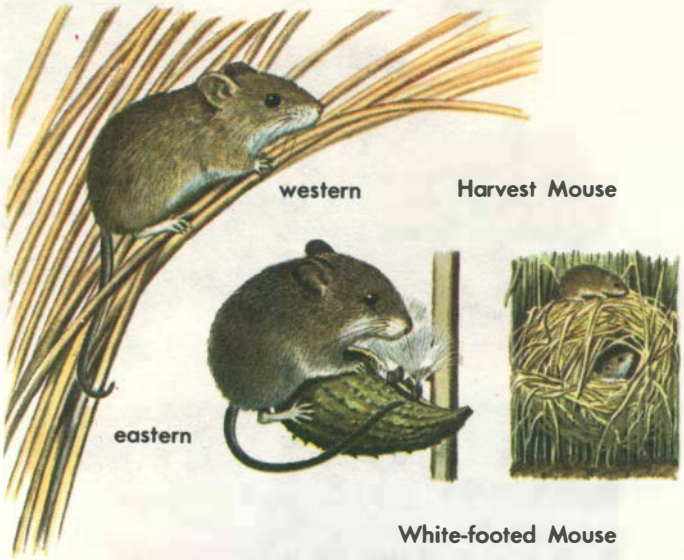
The house mouse, Norway rat, and black rat are found throughout the world. They have traveled with man wherever he has settled, and they rank among the most persistent and damaging of all pests. They also are carriers of diseases.

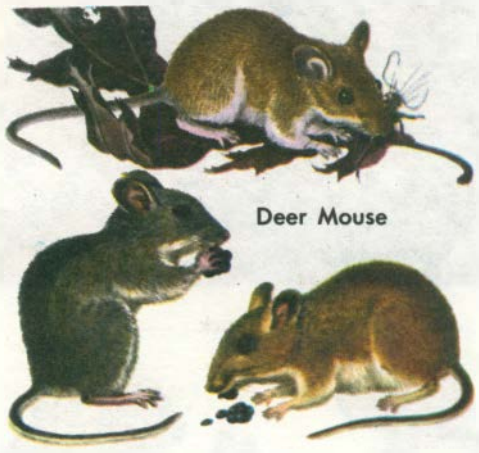
Many wild mice and rats are really attractive creatures. All of the nearly 200 species of white-footed, or deer, mice of North America are bright-eyed and immaculately decked in rich reds, grays, or browns. They have snowy white underparts. Nearly all of the many kinds of mice and rats feed on plants, eating the

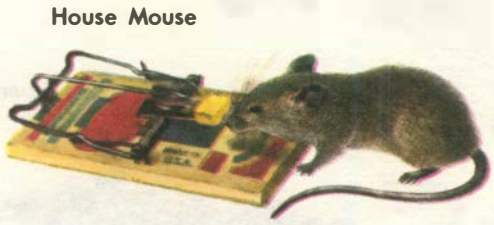
Richardson Ground Squirrel

Thirteen-lined Ground Squirrel

Chipmunk



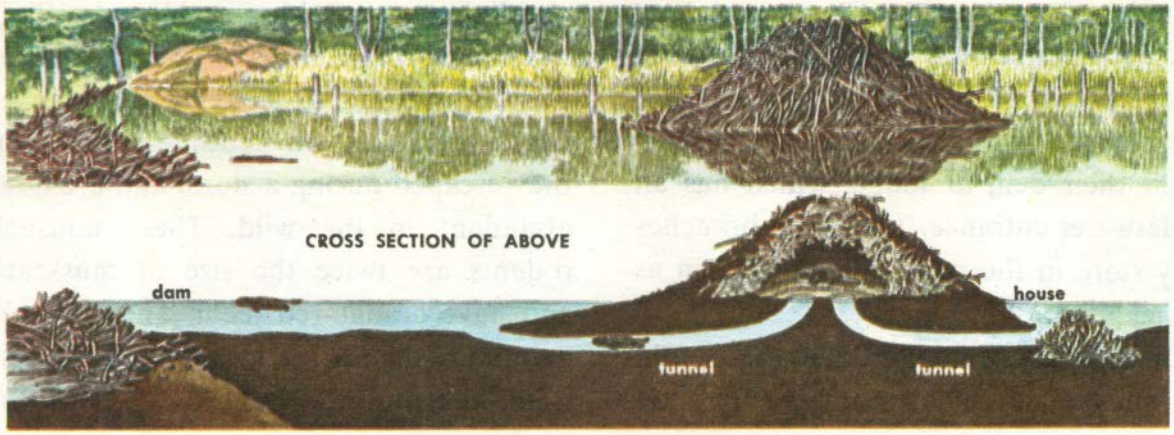




stems, seeds, or roots. Only a few kinds kill and eat animals. Among these are the grasshopper mice that stalk their prey like cats after mice. Even scorpions may be a part of this little animal's fare, though it will stuff its stomach with seeds when its hunting goes poorly.

Pack rats and wood rats, abundant in western North America, fill their nests with all sorts of items. They seem to have a strong liking for anything that is shiny. They are notorious for their visits to cabins, where they raid the cupboards and closets and usually leave a nut, a pine cone, or a rock in trade for what they have stolen. Often they surround their bulky nests with clumps of cactus spines that discourage larger marauding animals from entering.

Meadow mice, or voles, are short-tailed rodents that live in temperate or cold regions of the northern hemisphere. The lemmings, of Scandinavian countries and the arctic tundra, are voles well known for the suicidal migrations they take to the sea. In some years, the population of the lemmings becomes very large. When all of the food in their area is eaten, the lemmings move to a new territory. There, too, with their number first doubling, then increasing more, food is



quickly depleted, so the lemmings move on. The countryside soon swarms with millions of scurrying, hunger-driven migrants. Rivers, fiords, and the sea itself are plunged into without hesitation as the animals move forward. Many of the furry little animals drown.

The muskrats, largest of all the voles, dig burrows in the banks of streams, ponds, or lakes, or in marshes, where they may build clumpy nests of leaves and stems above the water level.

Porcupines are rodents that have an outer covering of quills as sharp as thorns. A porcupine does not hurl its quills, but when it is alarmed, the animal raises them so that they become a formidable barrier between itself and an intruder. It may also lash its tail, and pity the poor animal that gets close enough to be struck by the sharp quills.

North American beavers feed on the inner bark of shrubs and trees that they cut down with their powerful teeth. They use the branches and trunks to build dams, combining them with rocks and mud to make remarkably firm structures. As the pool of water builds higher, the beavers add to the height and length of their dam. Some of these exceptionally large beaver dams have stretched for more than half a mile. Of such dams,

Beaver

Muskrat

Porcupine

abandoned sections nearly ten feet long and equally thick have been found. Such a dam created a huge beaver pond.

In the pool behind the dam, the beavers build their den, or lodge, which has an underwater entrance. The green branches they store in the pool will serve them as winter food.

In the vast swamplands of the South, the muskrat must now compete for food and living space with a rapidly spreading newcomer—the nutria, or coypu. Nutrias were introduced to the United States as caged animals from South America, but they escaped during a storm and are now abundant in the wild. These unusual rodents are twice the size of muskrats and have orange-red teeth. The female's mammary glands are located high on her sides, allowing the young to nurse as the mother swims.

Among the rodents, the variety in size and appearance is seemingly endless. Some of the most attractive are the red mice of southeastern Asia and the golden yellow hamsters of Europe and Asia. Also familiar as pets are the guinea pigs, natives of South America. They are close relatives of the agoutis, which also live in South America. Agoutis are about the size of a large rabbit. When feeding, they hold food in their front paws, as squirrels do. Desert-dwelling jerboas and kangaroo rats and mice of North America have large, powerful hind legs for jumping. Largest of all the rodents is the South American capybara, which stands nearly four feet tall and weighs more than 175 pounds.

Hamster

Agouti

Capybara

Nutria

Rabbits and Hares

Rabbits and hares resemble the rodents and are closely related. They differ from them in having two pairs of front teeth in the upper jaw, while rodents have only one pair. Both the rabbits and the hares have mild dispositions, but they will defend their young in the nest against predatory animals many times larger than themselves.

Rabbits are born naked and helpless, with closed eyes. Hares are born with fur and with their eyes open. Hares can move around soon after birth, but baby rabbits must be cared for in the nest for a week or longer before they can set off on their own.

Jackrabbits of North America are really hares. They may leap 20 feet in a single bound, and, at top speed, they can travel more than 40 miles per hour. Speed is important to jackrabbits, for there is no place to hide in the wide-open prairie country where they live.

Varying hares, or snowshoe rabbits, of the arctic and tundra regions, are best known for their change of colors with the season. In winter, they wear snow-white camouflage coats; in summer, their coats are brown. They get their name, "snowshoe," from their big paws, which help them to move easily over snow or ice.

Cottontails, or rabbits, are smaller and less fleet than the hares. Some live in woodlands, others only in swamps, and still others in deserts. These rabbits are a favorite of small-game hunters.

Tiny pikas, or conies, are relatives of rabbits. They live in rocky highlands throughout the northern hemisphere. Their shrill whistles are commonly heard in mountainous country, but the animals themselves are difficult to sight.

Pika

Jackrabbit

Cottontail

Sea-dwelling Mammals

Whales, dolphins, and porpoises belong to a group of mammals that have made such a complete return to the sea that they even have a fishlike body shape. They still breathe air, however, so, despite their deep dives and ability to remain submerged for long periods, they must surface from time to time.

When a whale surfaces, it exhales "used" air through a blowhole (or two, in some kinds of whales) in the top of its head. In cold weather, this warm breath, filled with moisture, changes quickly into vapor. This makes the familiar "spout." Those who know whales can identify each kind by the shape of its spout.

Whales and their relatives give birth to a single young, called a calf, and the mother nurses it under the water. Her mammary glands are located beneath flaps of skin at the rear of her body. The openings of the pockets are toward the tail, hence water does not enter them as the mother swims along.

The largest of all mammals—and the largest animal that has ever lived—is the blue whale. It may measure 100 feet long and weigh as much as 150 tons. Its huge head accounts for about a quarter of the animal's total length. Its normal swimming speed is about 15 miles per hour, but harpooned whales have been known to go twice as fast.

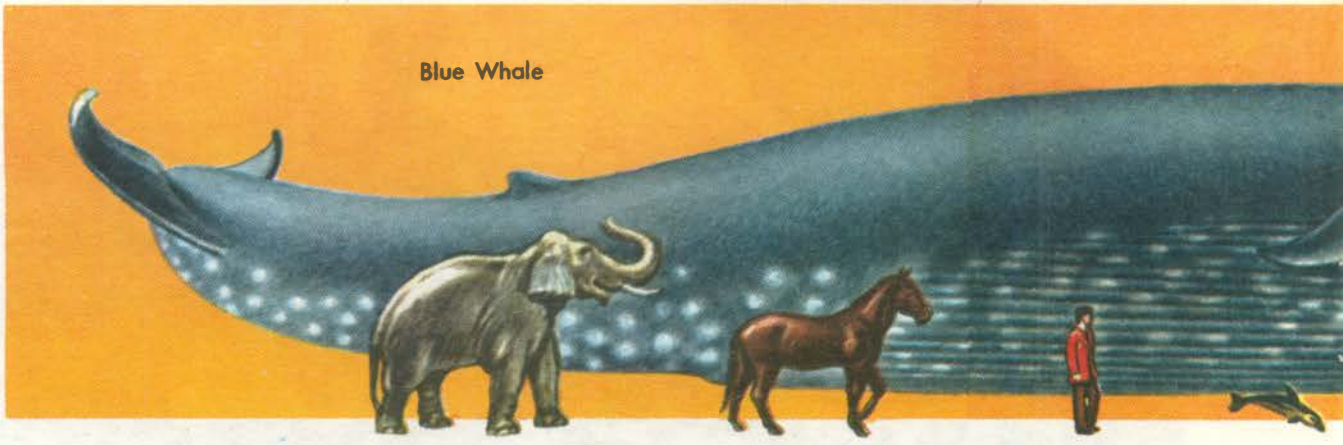
The blue whale belongs to a group that lacks teeth. Instead, they have sheets of whalebone, or baleen, at the back of the mouth. These form a sieve that strains out animals from the water taken into the whale's mouth.

Other members of the baleen whale group are the right whales, so named because they were the "right" ones to hunt; finback whales, which have a prominent triangular fin just in front of the tail; humpbacked whales, named for their bent, or humped, shape in their spectacular leaps from the water; sei whales, said to be the fastest swimmers in the group; and the gray whales.

baleen whale

Baleen whales live on tiny shrimplike animals called krill. Toothed whales eat squid, octopus, and other large marine animals.

toothed whale



Toothed whales form another large group. They use their many teeth for grabbing and holding prey, not for chewing. The most unusual of the group is the narwhal, of arctic waters. It has only one tooth, which is nearly half the length of its body and sticks out in front like a knight's lance.

The largest toothed whale is the sperm whale. It may measure up to 60 feet long. A male sperm whale has a very large, square-fronted, or boxlike, head. The space inside is filled with a white oily substance called spermaceti, believed to help cushion the head from the tremendous pressure of the water when the sperm whale "sounds," or dives into very deep water.

Sperm Whale

Humpback Whale

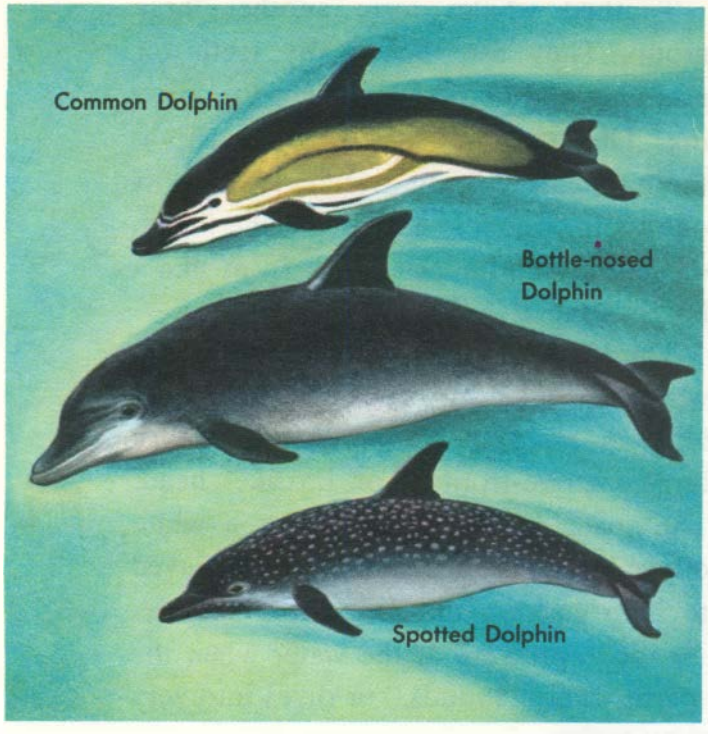
Sei Whale

Killer Whale

Right Whale

Finback Whale

Gray Whale



The killer whale, up to 30 feet long, is one of the most ferocious of all land or sea animals. It travels in packs of 40 to 50 animals that work together in herding and harassing a victim until it becomes exhausted. Then the pack moves in for the kill and feeding. No animal in the sea, including whales twice their size, can escape a hungry pack of killer whales.

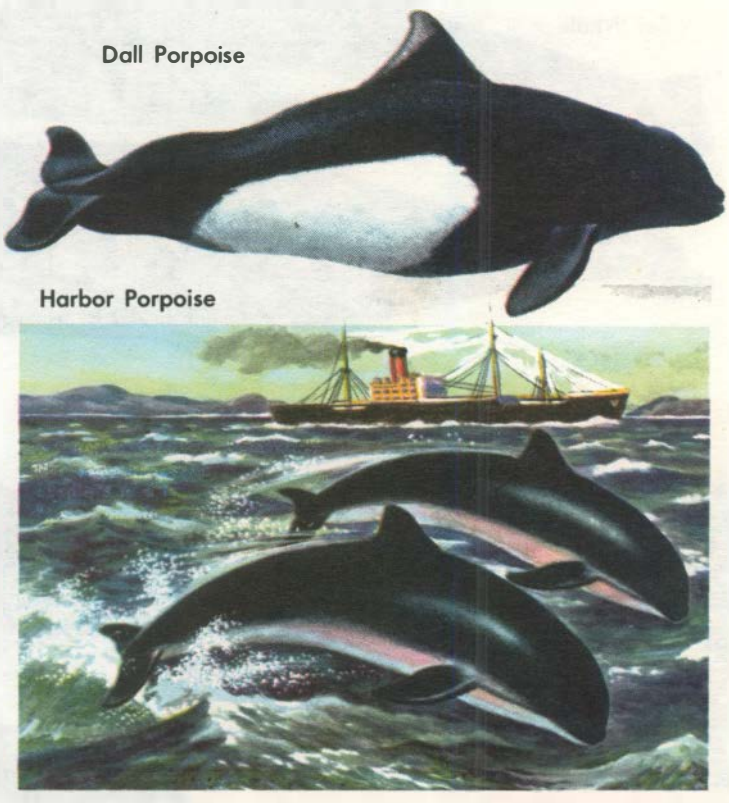
In recent years, to everyone's surprise, the killer whale has proved to be rather easily tamed, rivaling other dolphins in intelligence and response to training. Killer whales are now the star performers at several marine exhibits.

Killer whales are members of a group of small whales called dolphins, most of which have a distinctly beaked snout and numerous teeth. Compared to the similar porpoises, they have a much slimmer, more streamlined body. Dolphins are excellent swimmers and commonly leap from the water. They are friendly, often sporting playfully around swimmers, but they are also wary.

Dolphins are intelligent animals, and at marine exhibits, it is generally the bottle-nosed dolphins that are taught to jump, throw balls, and put on other acts. They communicate with each other by whistles, squeaks, chirps, and grunts. Scientists are trying to learn their language. Some believe that the dolphins can be taught to talk.

Porpoises are less common and much heavier bodied than dolphins. Their name, in fact, comes from the French word meaning "sea hog," for they were once considered to be a delicacy—literally, a fish that could be eaten on days when meat was forbidden.

Until recent years, the main interest in the mammals of the sea was commercial. The great whales were hunted for their meat, hides, oil, and other products. Many of the kinds of whales are now near extinction, and most governments no longer permit whaling.

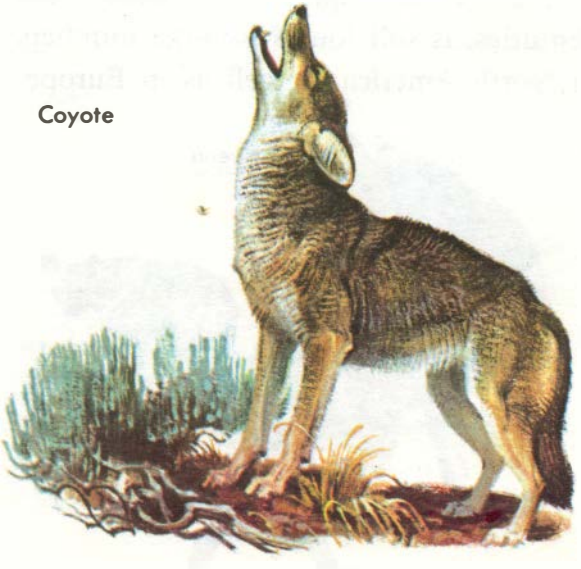


The Flesh Eaters

The top position in most food cycles of larger animals is occupied by a flesh-eating mammal, or carnivore. This is the group containing such familiar animals as dogs, cats, and bears. Nearly all of the many different kinds of carnivores have strong, sharp teeth. Most of them also have sharp claws. Typically, they have excellent eyesight, and they can move swiftly when hunting.

The reigning member of the dog family in the northern hemisphere is the wolf, but it has been pushed nearly to extinction by man. A full-grown wolf may weigh more than 150 pounds. In winter, when food becomes harder to find, hungry wolves may band together in packs and hunt down animals as large as moose. They are most likely to catch only the older and less agile animals, however. The wolf's steady diet consists of lemmings and other small animals.

The wail of the coyote signifies the American West. This animal was labeled an incurable killer by sheepmen, and large numbers of coyotes have been poisoned or shot. Coyotes generally eat mice and other small rodents, however, and it is only an occasional coyote that becomes a troublesome killer.


Coyote

Another wild member of the dog family is the Australian dingo, which is believed by some to have originated from domestic dogs turned loose by, or escaped from, natives of that continent. Cape hunting dogs of Africa and the similar dholes of India are both famed for hunting in packs. They will prey on any animal that they can overpower. Jackals, found in both Africa and Asia, are largely carrion eaters, although they do eat insects, some plants, and any small animal they can catch.

All foxes are members of the dog family, and all of the many kinds of foxes have a reputation for cunning. The red fox, an elusive quarry of hunters for centuries, is still found in large numbers in North America as well as in Europe. It lives in woods and fields, often daringly close to houses.

The several kinds of foxes that live in the deserts are noted for their speed and

their ability to dodge quickly when chasing prey or when being chased themselves. Like other desert animals, they are active mainly at night, and their large ears are useful in picking up sounds. In contrast, the Arctic fox has the smallest ears of all the foxes, for big ears would easily freeze in the below-zero weather. The Arctic fox's white coat is an excellent camouflage in the white snow.

Hyenas look a great deal like dogs, but they are not closely related. Hyenas are nature's garbagemen. They will eat almost any kind of available food, dead or alive. One kind of hyena is known for its strange "laughing" call.

Bears are found on all continents except Australia and Antarctica. They are the largest of the carnivores, the grizzly and polar bears weighing as much as 1,000 pounds. Both live in the cold North, the polar bear actually inhabiting floating islands of ice in the Arctic sea. The polar bear eats fish, seals, and other animals that it can find in the cold region. Most bears will supplement their meat diets with meals of berries, nuts, grass, fruit, or even seaweed.

All bears walk with a shuffling, flat-footed gait. They do not hibernate in winter, despite the popular belief that they do. They do sleep for long periods when the weather is bad but will awaken several times during the winter to feed.

Giant pandas look like bears, but are more closely related to the raccoons. They are found only in China and are mostly plant eaters. Bamboo shoots are a favorite food, and they spend much of their time eating.

Polar Bear

Giant Panda

Grizzly Bear

Black Bear

Raccoon

Raccoons are easily recognized by their black mask and ringed tail. They share these features with coatis and cacomistles, their American relatives. Raccoons hunt for crayfish, frogs, and other animals along the shores of ponds, lakes, and streams. They are noted for their habit of "washing" their food before they eat it. This consists of dunking the food in water and is probably done to help soften it.

Weasels are sleek and almost snake-like in their movements. Many weasels are bloodthirsty creatures, killing not only for food but also for the pleasure of killing. An ermine is a small weasel that gets a white winter coat.

Mink, one of the largest of the weasel family in North America, are also prized for their fur. Mink live along waterways. Martens, fishers, and wolverines are other members of the weasel family. Though only about four feet long, a wolverine may attack and kill a caribou. Wolverines will raid a cabin and turn its contents upside down; they may also follow a trapline and steal all of the catches. In the North Country, people use the coarse fur of the wolverine to trim their parkas, for it does not collect the moisture from their breath and freeze.

Otters, the most streamlined of the weasel family, spend most of their time in the water. River otters, widely distributed in North America, may travel 15 to 20 miles a night, visiting ponds and streams to catch fish, frogs, and other animals. Otters will fight courageously if cornered, but they are too wise to get into such predicaments often. They can escape

quickly, swimming swiftly or submerging and staying out of sight for a long time. Otters are playful, often making a mud slide—or a snow slide in winter—down a bank into the water near their den. Whole families will participate in the play, taking turns going down the slide.

Sea otters, larger cousins of the river otter, live in the North Pacific. They rarely come ashore, even resting and sleeping while holding on to mats of floating kelp.

Badgers live in woods and grasslands of western North America. They can dig so rapidly that they seem literally to melt out of sight. Like nearly all members of the weasel family, they have musk glands that give off a strong odor when the animals are disturbed. This gaseous protective device is best developed in the skunks, which can actually fire their spray, with accuracy, ten feet or more. A direct hit can blind an attacker, and the odor of a release may carry for a quarter of a mile.

Still other members of the weasel family are the civets, genets, and mongooses. The gray mongoose is known for its fearless attacks on cobras. It agitates the deadly snake to strike and then dodges. As the cobra's head strikes the ground, the mongoose moves in quickly to grab the reptile by the head and kill it. Mongooses are valued as rat exterminators in some areas.

Skunk

River Otter

Wolverine

Badger

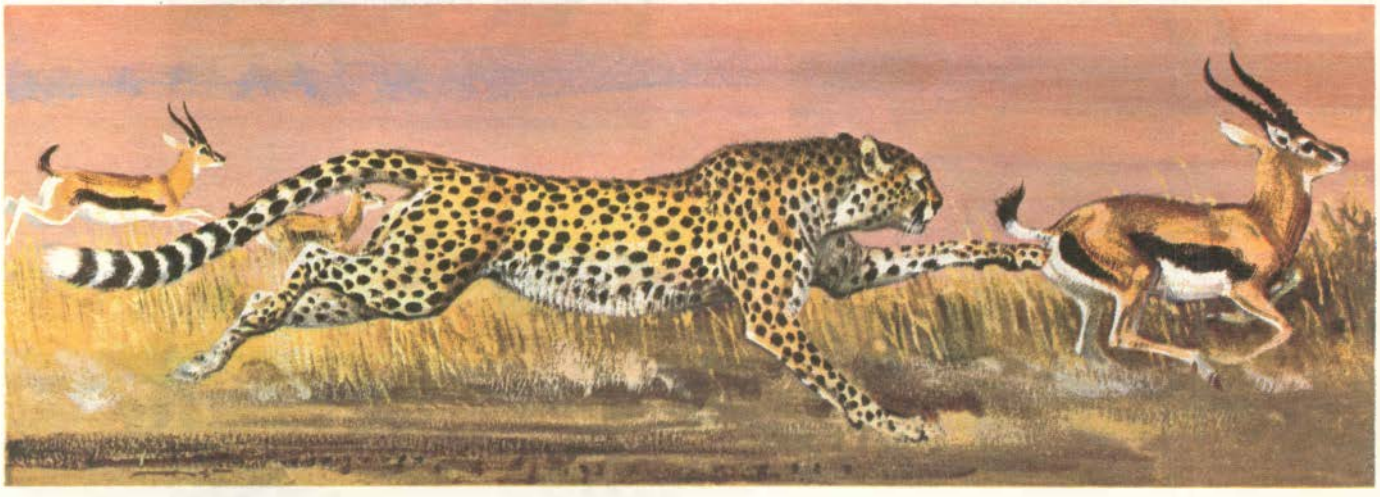
Mink

Cats are lithe, graceful carnivores that typically spring on their prey. They use their sharp, hooked claws to help hold the victim and to help tear it apart. Most cats can retract their claws into sheaths when they are not in use. An exception is the long-legged cheetah, the swiftest and most doglike of all the cats. A cheetah can run 70 miles an hour for short distances and can reach this speed in less than a minute. In times past, cheetahs were trained to run down antelopes for hunters.

Cats have sharp fangs for holding their prey, but they have poor grinding or chewing teeth. Their rough, filelike tongue is used to rasp flesh from bones, as well as serving as a "comb" to put their fur into place. A cat's eyes are very large, fitting it for night hunting, and it has excellent hearing. The long whiskers serve as sensitive feelers. Cats do not have as good a sense of smell as dogs have.

Cats are found as natives throughout the world, except for Australia and the polar regions. They range in size from the large Siberian tiger to the much smaller domesticated varieties. Most of the large wild cats do not purr, but they can and do roar. Domestic cats purr, as do many other small cats. The domestic cat has been a pet for thousands of years, yet it has maintained reserve and a certain wildness that add to its fascination.

The largest cat in North America is the mountain lion (cougar, puma, or panther). Though it is the size of a female lion, the mountain lion does not roar. It is now found only in wildernesses and other remote areas.



Cheetah

Siberian Tiger

Mountain Lion

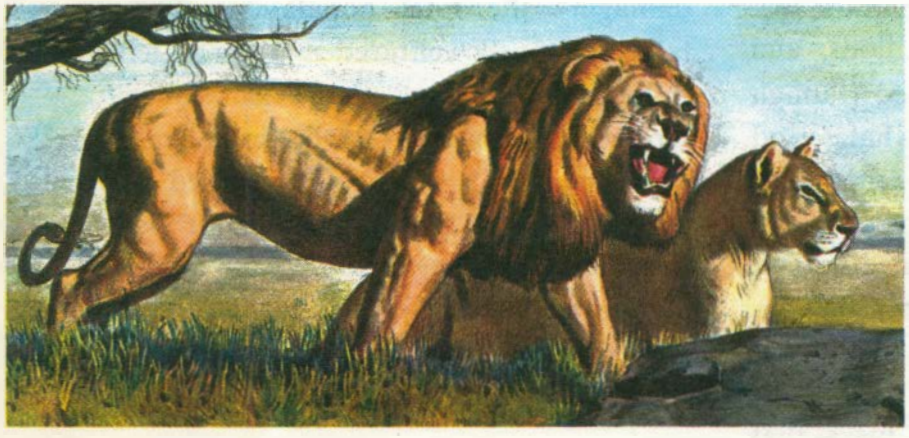
The jaguar, still larger than the mountain lion, is most abundant along the waterways of the American tropics. It occurs in two color phases: black and spotted.

An African lion rules as the king of beasts more because of its appearance than because of fierceness. Sporting a shaggy mane, the male lion has an unsurpassed air of regal dignity. A lion rarely makes a kill unless it is hungry; futhermore, lions will return to a kill the following day, to feast on the remains until all has been eaten. Lions commonly travel in small bands, or prides, that consist of several females, with their offspring, and a strong young male.

The tigers of Asia are as large as lions. One variety lives in the cold mountainous region and has a heavy fur coat. Those that live in the lowland jungles have much shorter hair. Both lions and tigers may occasionally become man-killers, but a killer cat is generally an older animal that has become too feeble to catch its natural prey.

Leopards, smaller than either the lion or the tiger, range from the lowlands to the high mountains in Asia and parts of Africa. There are several color phases, including one that is all black. The leopard is considered one of the most cunning of the large cats.

Among the smaller cats are the bobcat and the lynx. The lynx is found in Europe as well as in North America. The ocelot, margay, and jaguarundi are cats of the American tropics, where there are a number of still smaller cats. Other small cats are natives of Asia and Africa.



Lion

Bobcat

Jaguar

Leopard

Walrus

Sea-dwelling Carnivores

Several families of flesh-eating mammals are specially fitted for life in the sea. These are the walruses, sea lions, and seals. Their body is streamlined (though not as fishlike as those of whales and dolphins), and their legs are flippers, or paddles, for use in swimming. They can waddle clumsily on land. Beneath their skin is a thick layer of blubber that insulates them against the cold of the water in which they live.

A male walrus has ivory tusks that may be more than three feet long. It uses the tusks to fight with other males at mating time and to dig into the mud to get clams and other food. The polar bear is the chief enemy of the walrus, but killer whales and man have also taken their toll. Eskimos eat their flesh, make homes of their thick hides, and carve the tusks into tools and ornaments.

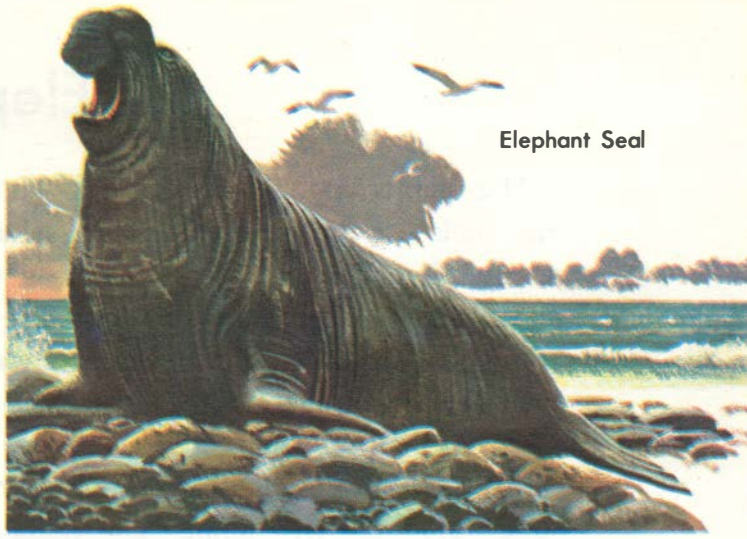
The few people who lived near enough to harvest these animals for their personal needs took all they could use, without damaging the total population. When large schooners ventured into the waters to hunt these animals, they began slaughtering half a million or more every year. The meat and hides were hauled all over the world. The population of walruses and seals began to dwindle alarmingly, and governments have had to set limits on how many can be harvested.

Harbor Seal

Of the sea-dwelling carnivores, the true, or earless seals, are the most completely adapted for life in the sea. Their hind flippers stick out behind them like a lobed tail and are virtually useless to the animals on land. Except in the very young seals, the fur is coarse and of little or no commercial value. Most common of the group is the harbor seal. Largest is the elephant seal, which may weigh more than two tons and measure 15 feet long. Its grotesque, inflatable snout may be two feet long.

Sea lions, or eared seals, can move about on land with considerable ease compared to other members of the group. The California sea lion is the common trained seal of circuses and marine shows. The most valuable of the sea lions are the fur seals, which have been heavily hunted. If not protected, they will be in danger of extinction.

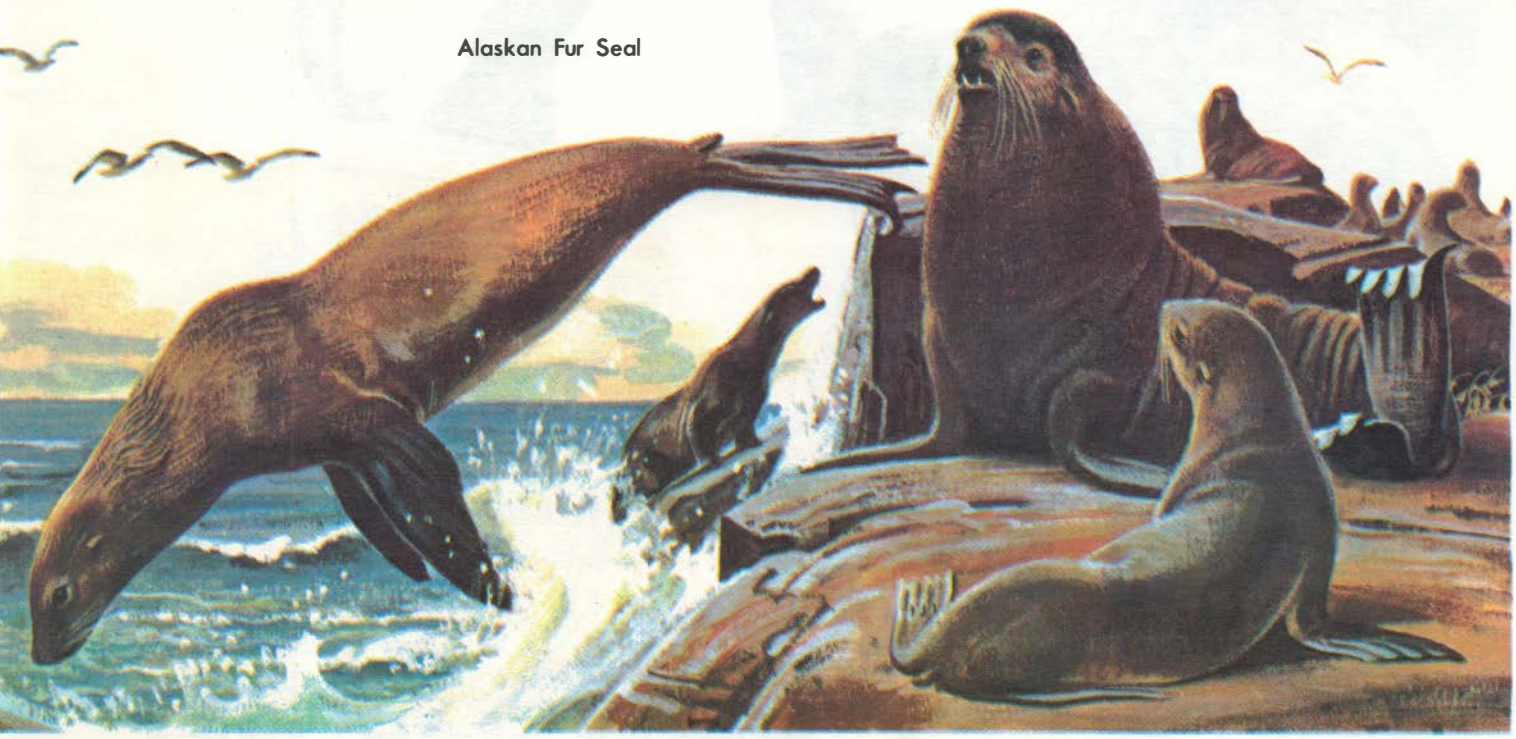
A bull, or male, fur seal, may be six or seven feet long and weigh as much as 700 pounds. The cows are a third smaller.



Elephant Seal

In the spring, the bull seal selects an area on an island and then defends it against other bulls that might try to get the same spot. As many as 50 to 100 females may be coaxed or forced into a large bull's harem. Bachelor bulls stay in groups of their own. The females are already pregnant from the breeding season before, and they soon give birth to their single pup. The burly, boisterous bull guards them, not even taking time to eat until the pups are old enough to put out to sea—in about three months.

Alaskan Fur Seal

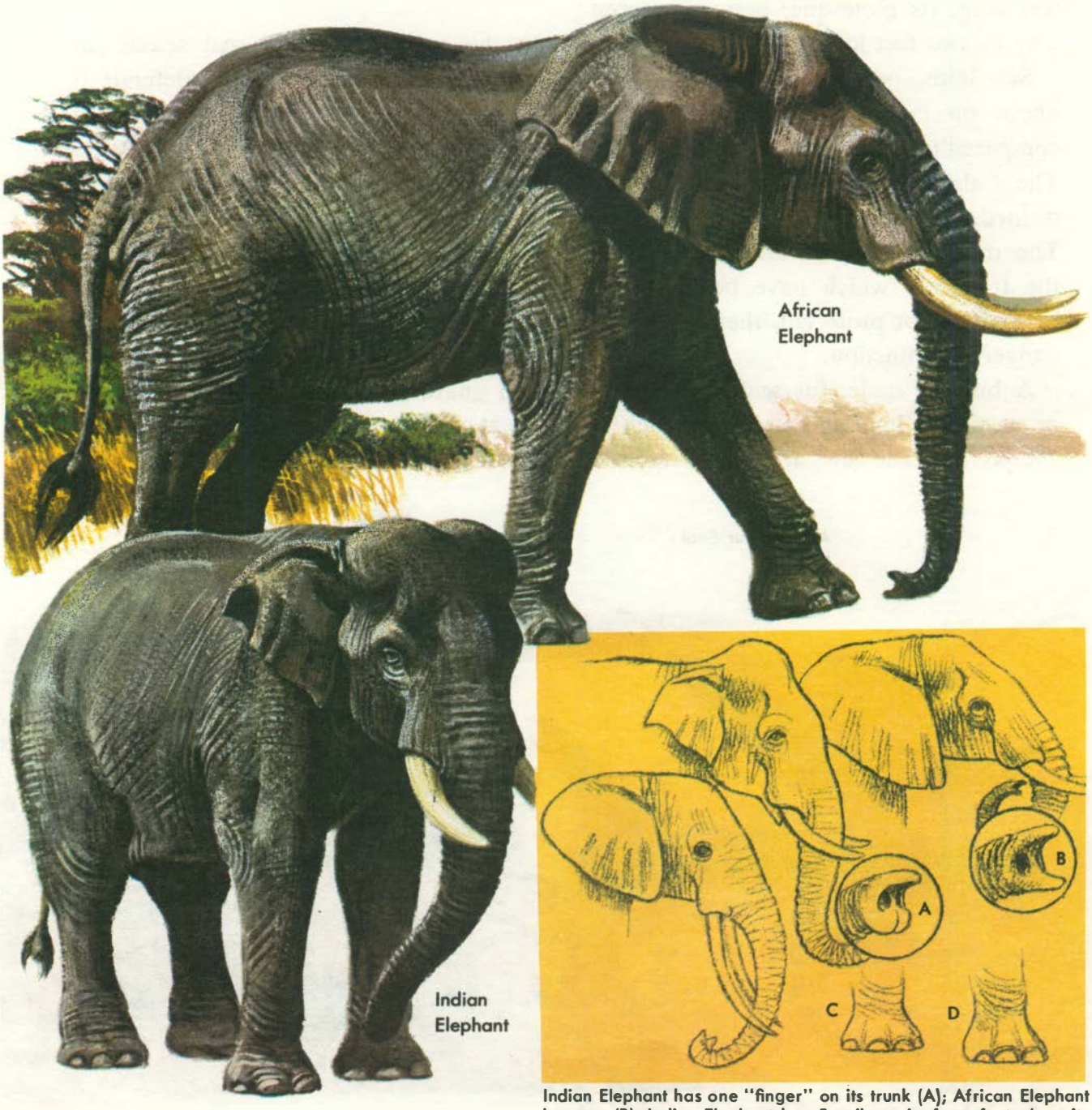


Elephants

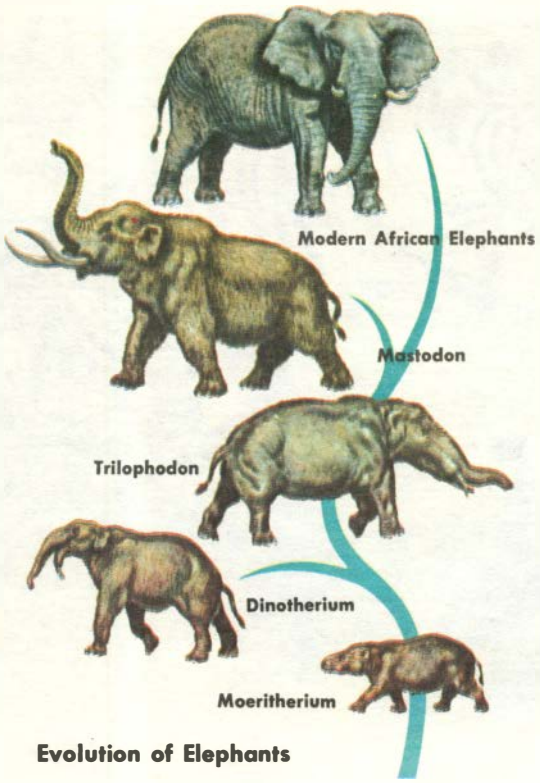
The giants among present-day land mammals are the elephants. They stand nearly 12 feet tall at the shoulders and may weigh as much as six tons. They are so ponderous that they never lie down, even sleeping on their feet. They may live for more than 40 years.

Elephants live in herds, although old bulls sometimes live alone. The female is a devoted mother and takes good care of her big baby.

The elephant's remarkable trunk is really an elongated snout. The elephant sucks water into its trunk and then sprays it into its mouth. With its trunk, it can also reach high into trees to pull down branches. The trunk is so strong that the elephant can lift logs with it, yet it is so



Indian Elephant has one "finger" on its trunk (A); African Elephant has two (B). Indian Elephant has 5 nails on its front foot, 4 on its back (C); African, 4 nails on its front foot, 3 on back (D).



Evolution of Elephants

delicately maneuverable that the elephant can pluck a peanut from your palm.

There are two kinds of elephants—African and Indian. The African is the larger of the two and has tremendous floppy ears. Its trunk ends in two "fingers," and it has three nails on each hind foot. Indian elephants, those most commonly seen in circuses or used as work animals, have smaller ears, one "finger" at the end of the trunk, and four nails on each hind foot. Elephants are such large animals that they require as much as a thousand pounds of food per day. To find enough food, they may have to wander over many miles. Man is their worst enemy and has reduced their numbers to near-extinction in Africa, where some of the few remaining herds are now protected in parks and reserves.

Elephants have a well-documented fossil history, much like the horse's. The earliest known ancestor was *Moeritherium*, which did not have a trunk. The most widespread and perhaps best known of the ancient elephants were the woolly mammoths. Early man hunted this big elephant, which stood as high as 14 feet and had tusks 16 feet long.

Sea Cows

This small group of totally aquatic mammals consists only of the manatee, found in tropical American waters, and two species of dugongs, of southeastern Asia and Africa. They do not come to shore even to give birth to their young. Large, timid beasts, they live in warm, shallow seas, estuaries, and rivers. They have small, paddlelike front legs and no hind legs or flippers on their bulky, spindle-shaped body. They swim mainly by using their broad, flattened tail.

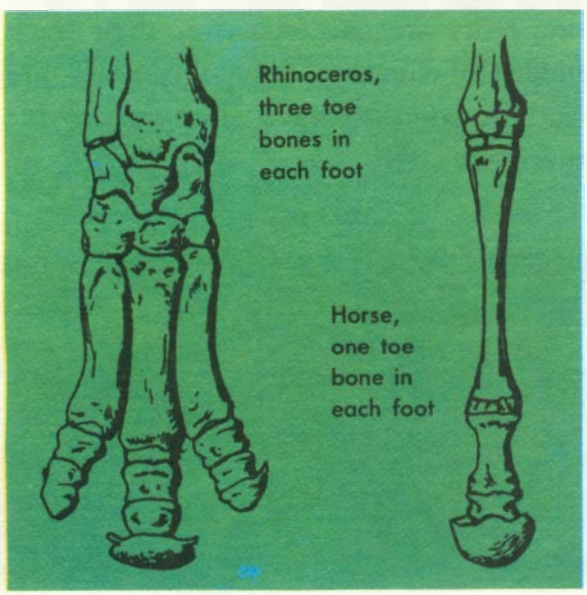
The bones in these heavy-bodied animals are solid, like ivory. They have a rounded head, piglike eyes, a small mouth, and large, flexible, bristly lips. Only a few hairs are scattered over their thick hide. Unbelievably, these ugly beasts are said by some to have given rise to the mermaid myth.

Manatee

Tapir Tiger

Odd-Toed Hoofed Mammals

While carnivores are the hunters among mammals, those with hooves are the hunted. They are mostly grazing animals, inhabiting the vast grassland areas. Most of them are swift runners. Their eyes are located at the sides of their head, enabling them to detect an enemy's approach from almost any direction. In contrast, the hunter's eyes are at the front of its head, directed forward.



All the hoofed mammals fall into one of two groups. One group is the odd-toed hoofed mammals. It is a small group and includes tapirs, rhinoceroses, and horses. The horse family includes such well-known animals as zebras, mules, and donkeys. These animals have either one or three toes on each foot, except for tapirs. Tapirs have three toes on each hind foot and four toes on each front foot.

The second group is the even-toed hoofed mammals. This is a large group and includes hippopotamuses, hogs, deer, antelopes, cattle, and others. These animals have either two or four toes on each foot.

Among the various kinds of odd-toed hoofed mammals are four species of tapirs. A tapir has the general appearance of a

small elephant with short legs and a sawed-off trunk. All are timid animals that live in the lowland jungles of the tropics. Two kinds are found in South America, one in Central America, and one in Southeast Asia.

Tapirs are good swimmers. They feed on vegetation, using their short trunks to help pull down branches or leaves. They are a favorite prey of the big flesh-eating mammals. The large tapir that lives in southeastern Asia is strikingly marked with a broad band of white around the middle of its body. An adult of this species weighs as much as 400 pounds and makes a fine meal for a tiger.

The horse has only one functional toe on each foot. This long middle toe is encased in a broad, horny hoof. The few Przewalski horses that still live in Mongolia are the only surviving wild horses. The wild horses, or mustangs, of the American West are descendants of domestic horses that escaped from the early Spanish explorers and became wild.

The various breeds of horses were developed for particular needs. When horses were used as work animals, many were bred for heavy, muscular bodies. Strength and endurance were important for those animals. Percherons were the most popular of the draft horses, or work horses, in the United States. Another common draft horse breed was the Clydesdale.

Most of the horses seen today were developed for riding—some for speed,

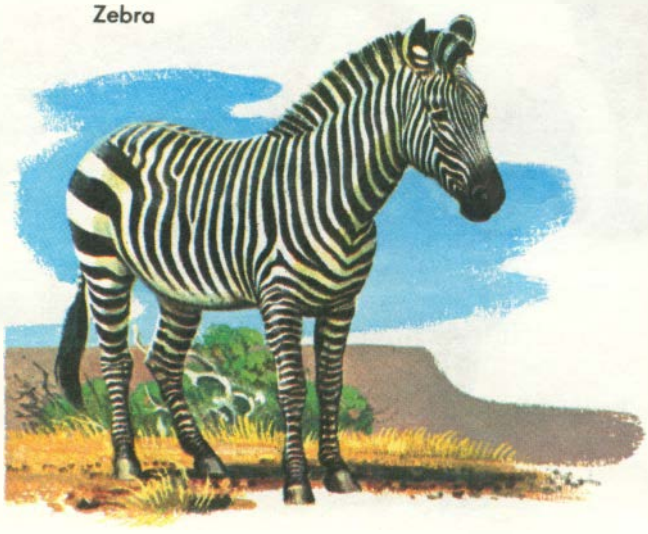
others for jumping, and still others for long-distance travel in the open country. Some are high-spirited, others very gentle. A few kinds, such as the hackney, were bred especially to pull carriages.

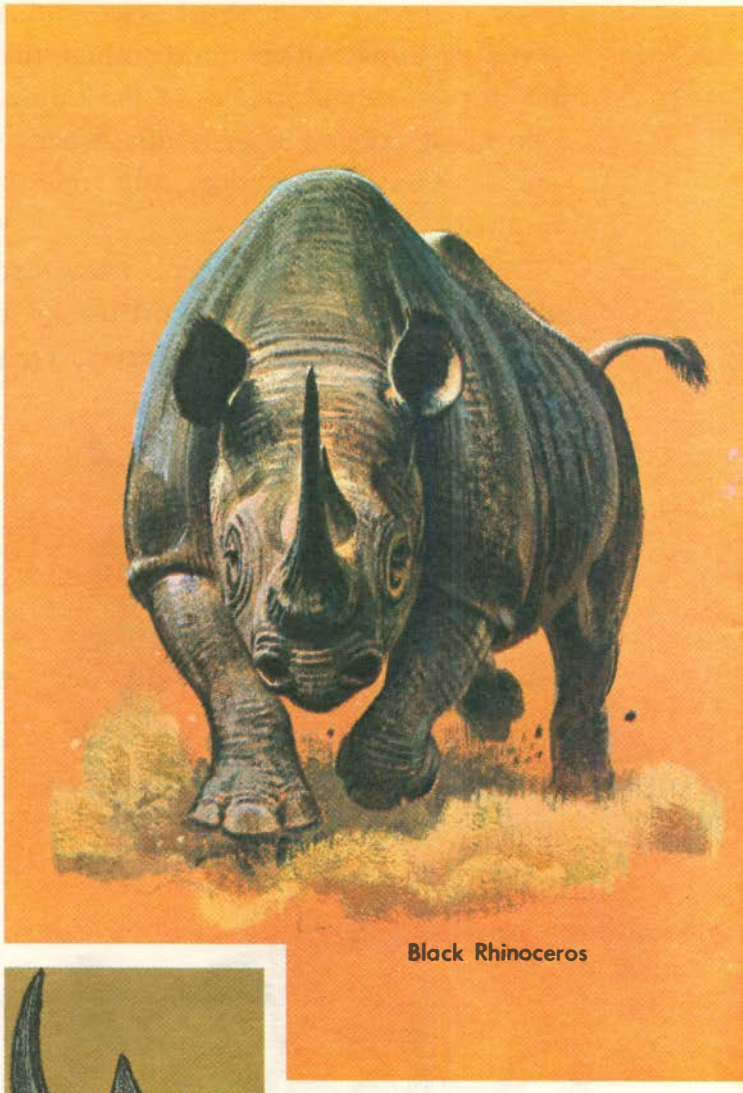
Arabs were the first people to breed horses. Many of the other breeds known today, including the Thoroughbreds, have an Arabian ancestry.

One of the most famous of the horse clan in America is the mule, which is a cross between a male donkey and a female horse. A cross between a female donkey and a male horse is called a hinny. Mules are sterile, hence cannot produce young. They are very intelligent beasts—believed to be more so than either of their parents—and they are also extremely stubborn. Because they are more cautious and more surefooted than horses, mules are valued animals for traveling in rough, mountainous country.

The several kinds of zebras that live in the savannas of Africa are closely related to horses. All of them are small—pony-sized—and no two individuals are identically striped with black and white. The stripes camouflage the zebras by breaking up their body lines and making them less visible to enemies.

Zebra



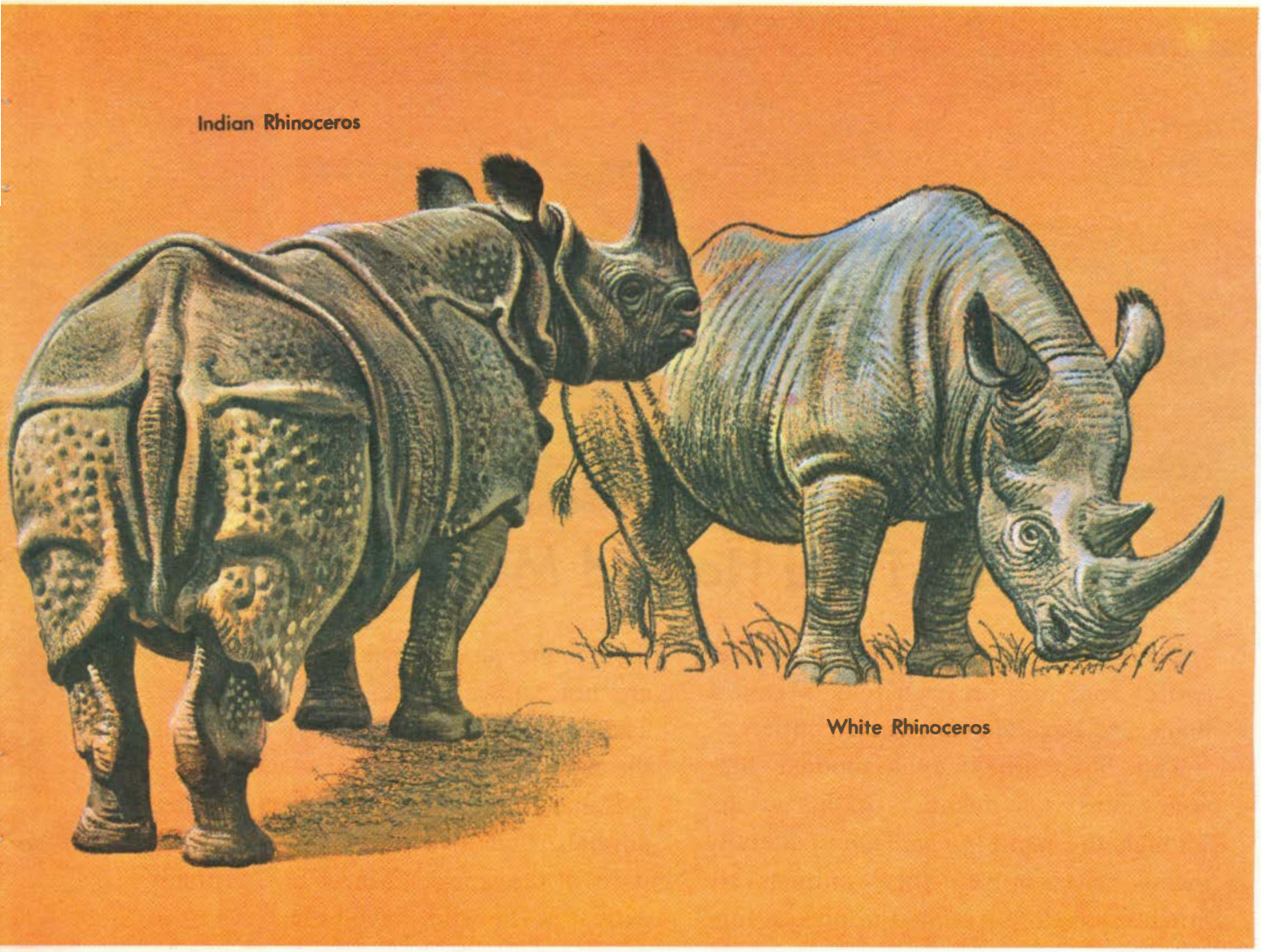


Black Rhinoceros

The horn of a rhinoceros is made of fused hair and hide. It sits firmly on the front of the skull.

Large herds of zebras may contain hundreds of animals. They commonly mingle with gnus, roans, and other antelopes of the savannas. When attacked by lions, zebras bite and, at the same time, slash with their front legs and kick strongly with their hind legs.

Because of the disappearance of wilderness grasslands in much of Africa,



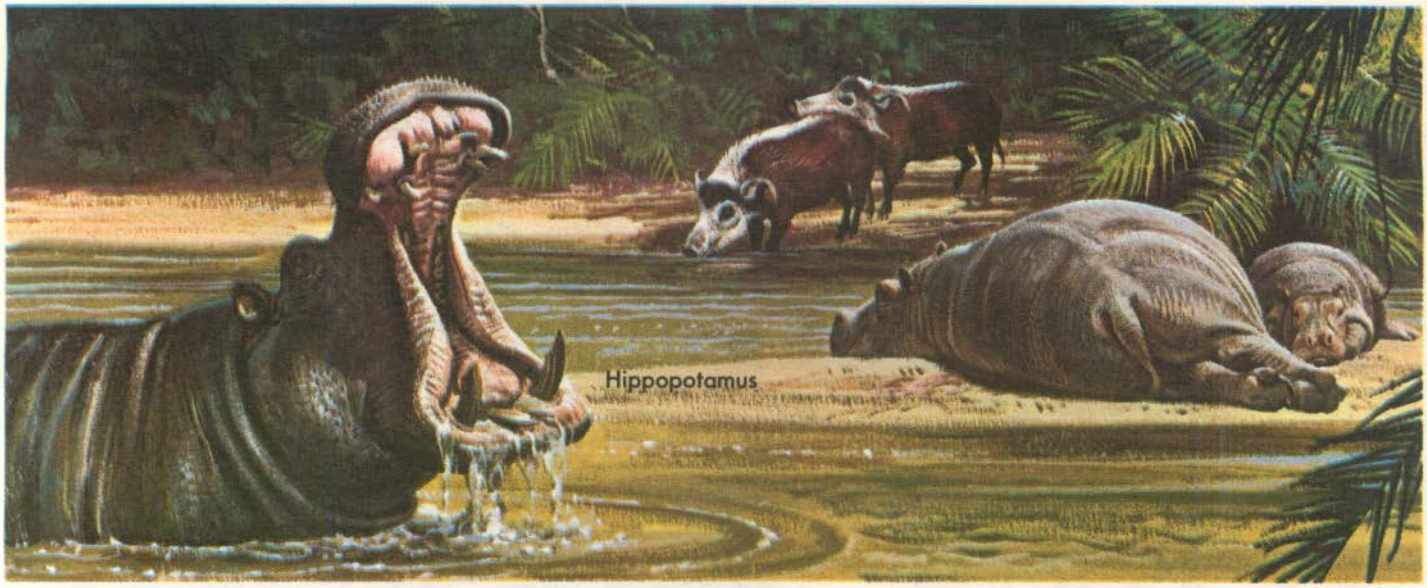
zebras are now becoming scarce. Again, man has been a much greater enemy than any of the predators, for man has destroyed the areas where the zebras live.

Rhinoceroses of Africa and Asia are bad-tempered beasts, easily provoked into attacking. They lower their head and make a blind-fury rush, sometimes at a speed of 30 miles per hour. Their vision is extremely poor, however, and much of the time they miss their intended victim by a wide margin.

Both the white and the black rhinoceros of Africa have two horns. The large horn of the white rhino may be as much as three feet long. The Indian rhinoceros has only one horn.

Among many primitive peoples, the powdered horn of the rhino is believed to have mystical medicinal properties. This has been one of the principal reasons for hunting these animals, which has put them on the list of endangered species.

The white rhinoceros is a grazing animal. Compared to the black rhino, a browser, it has a longer neck for reaching down to the ground easily. Its broad lips are squared over a wide mouth. The upper lip of the black rhinoceros is tapered into a fingerlike projection that is used in pulling down leaves and branches. A black rhinoceros weighs about 1½ tons; the white rhino, about 3½ tons. A rhino's hide may be as much as two inches thick.



Even-Toed Hoofed Mammals

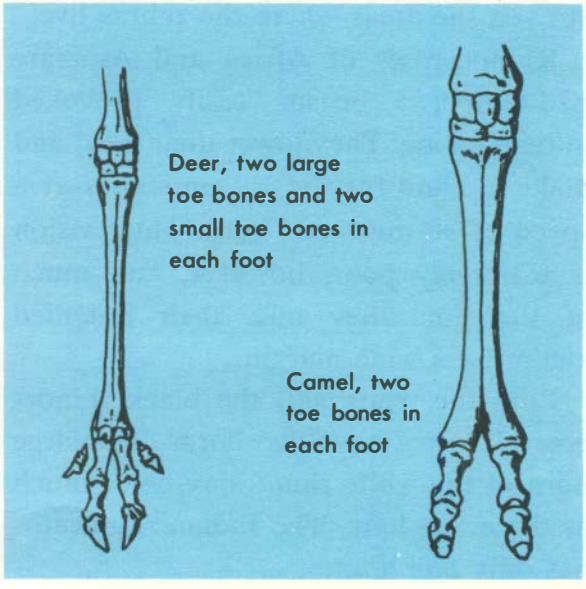
Even-toed hoofed mammals have either two or four toes on each foot. Many of them also have either horns or antlers.

The bigmouthed, bulky-bodied hippopotamus is a member of this group. Though the name *hippopotamus* literally means "river horse," these animals are much more closely related to pigs. A hippo's eyes and nostrils are located on bumps, enabling the animal to see and breathe while almost completely submerged. Hippos feed on plants that grow in or near the water. They can also go underwater and walk along the bottom. A large hippo may weigh as much as four tons.

Warthogs and other wild pigs and hogs all have long, tough snouts with which they root to get their food. They eat mainly fruits, roots, and other plant matter, but they will also kill small animals and eat them. They have no hesitation about tackling even poisonous snakes.

The tusks of the babirusa of southeastern Asia are much twisted and curled and may be a foot and a half long. Although the tusks are fierce-looking, they are not known to be used for defense. The female has much shorter tusks than the male.

Camels and llamas are closely related animals that live in widely separated parts of the world. Camels, now virtually extinct in the wild, have been servants of man for centuries. The dromedary, or one-humped camel, once lived in the desert country of North Africa. The Bactrian,



or two-humped camel, is from south and central Asia, where a few apparently still roam wild in the Gobi Desert.

Camels can travel for days without water. They utilize water that is stored in cells lining their stomach. When water is available, they drink large amounts. The humps on a camel's back are stored fat, a reserve food supply.

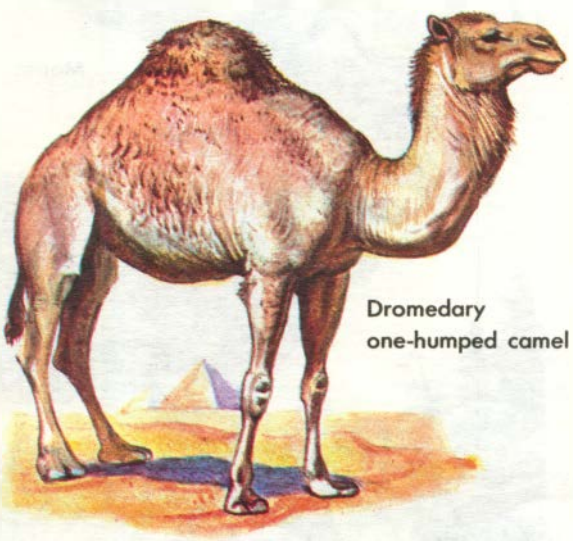
With their broad, padded feet, camels can move across soft sand without sinking in, and they can carry loads of several hundred pounds. Camels have mean, balky dispositions. In addition to kicking, they have the unsavory habit of spitting in the face of anyone who angers them. Desert-dwelling people have long depended on camels to supply them with not only transportation but also with meat, milk, and hides.

Warthog

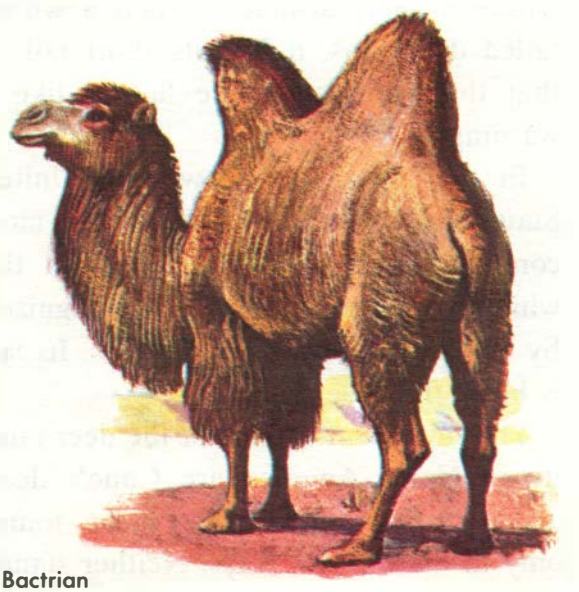
Babirusa

Llamas are as cantankerous as camels, and, like camels, they have served people for many years as beasts of burden and as sources of meat, milk, and hides. Alpacas, their smaller relatives, are also domesticated, and their long fleece is valued in weaving cloth. Both llamas and alpacas are grazers, like sheep or cattle. Guanacos and vicuñas are wild cousins of the llamas and alpacas. All of them live on the grassy plateaus of the Andes in South America. Vicuñas are good climbers and may be found at altitudes as great as 18,000 feet.

Llama



Dromedary
one-humped camel



Bactrian
two-humped camel

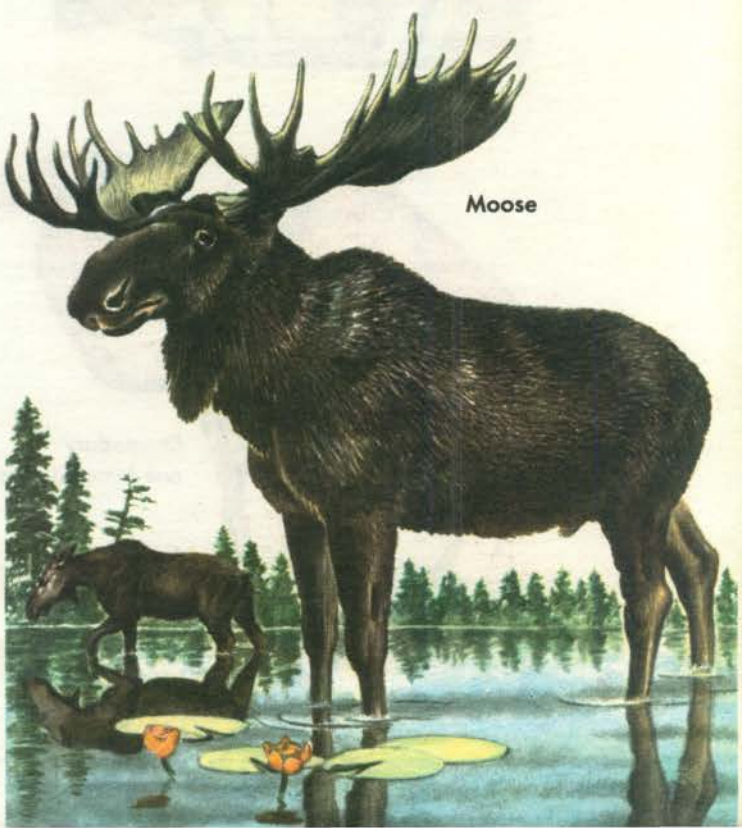
White-tailed Deer

The white-tailed deer is the most common deer of eastern North America. It actually became more abundant after the broad forests were cut and the land grew up in brush. They do best where there are many "edges"—that is, places where forests, fields, and brush or open country are intermixed. This puts a variety of food and also cover, or a place to hide, all within a short distance. When a white-tailed deer runs, it lifts its short tail so that the white underside flashes like a warning flag.

In the mountains of western United States and Canada, the mule deer is most common. It is slightly larger than the white-tailed deer and is easily recognized by its large, floppy, mulelike ears. Its tail is black-tipped.

The smallest members of the deer family in North America are Coue's deer, of the Southwest, and Key deer, found only in the Florida Keys. Neither stands

Moose



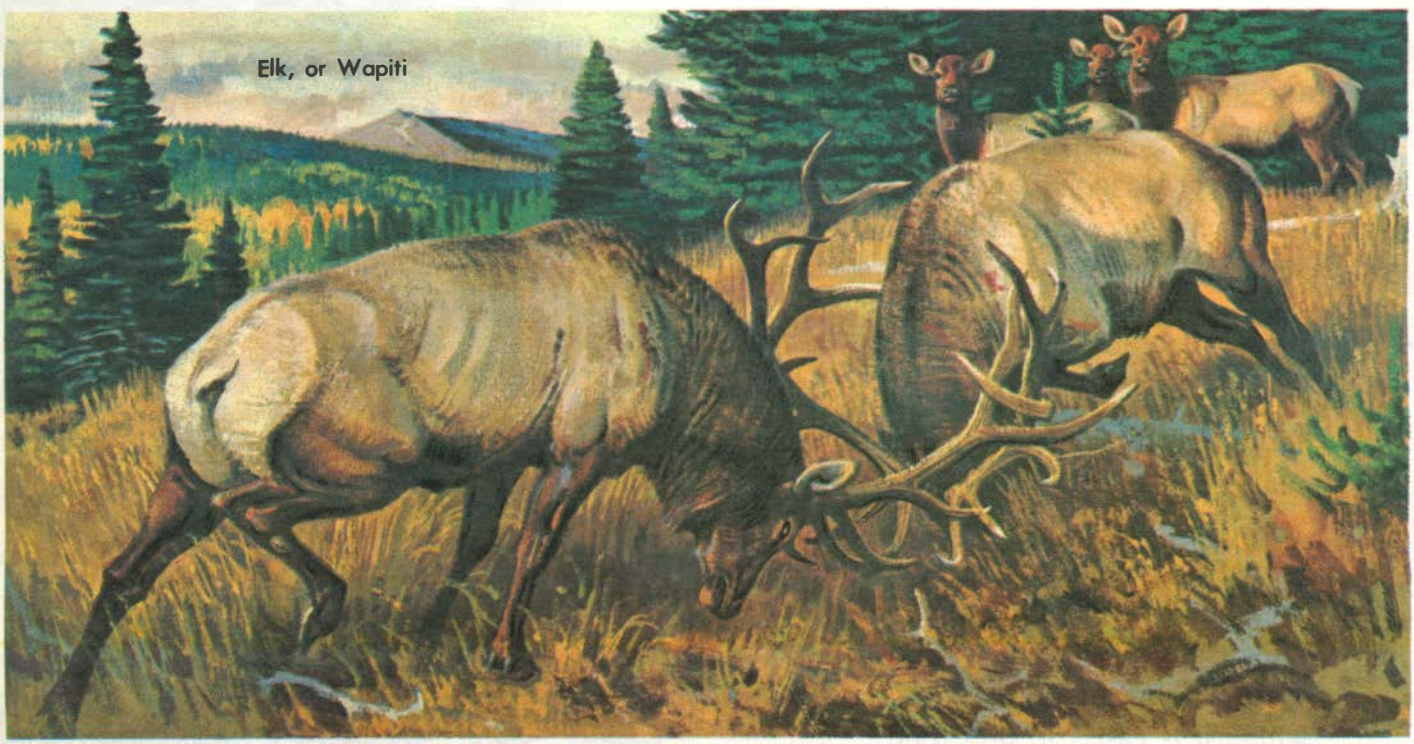
much taller than two feet at the shoulders. Muntjacs, or barking deer, of southeastern Asia, are about the same size, as are the brockets of Brazil and the pudus of Chile. Chevrotains, or mouse deer, are about the size of rabbits. These tiny deer, one kind living in Africa and another in Asia, do not have antlers.

In Europe, the fallow, red, and roe are the common deer. Red deer, which may reach a weight of 400 pounds, were the deer hunted in Europe in the early days. Now they are rare. Fallow deer have flattened antlers, somewhat similar to those of the moose. The fallow deer is known especially for its ability to jump.

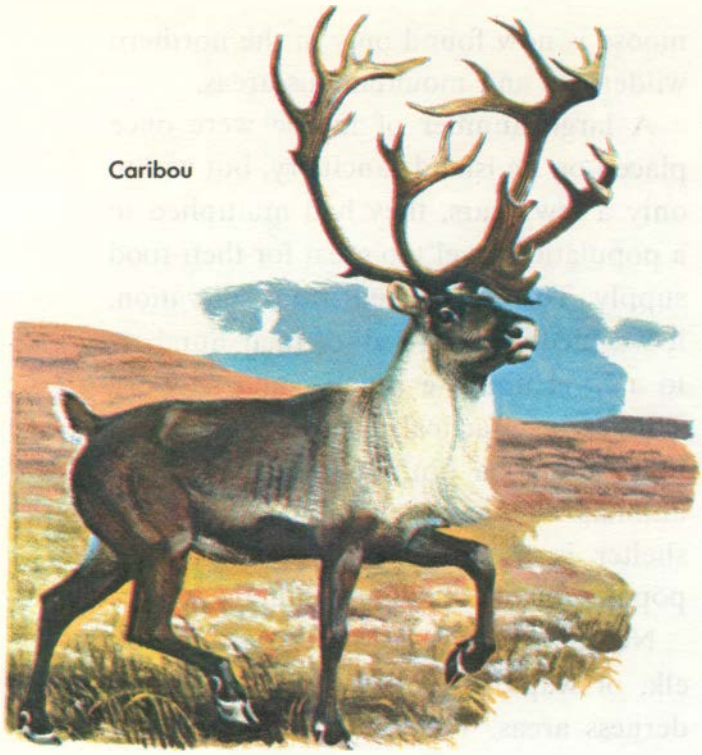
Largest of all the hoofed mammals in the northern hemisphere is the moose, a member of the deer family. A bull moose weighs nearly 1,500 pounds, and its broad, flat antlers may have a spread of nearly six feet. A big moose has only one serious enemy—man. Because of settlements and the clearing of wilderness areas, the moose is now found only in the northern wilderness and mountainous areas.

A large number of moose were once placed on an island sanctuary, but within only a few years, they had multiplied to a population level too great for their food supply. To protect them from starvation, it was necessary to reduce their numbers to a level that the island could support. This early, practical example of the fact that there is a limit to the numbers of animals a tract of land can feed and shelter is used today in managing the populations of big game animals.

Nearly as large as the moose is the elk, or wapiti, found today only in wilderness areas. The rounded, sharp-tined antlers of the male are magnificent. As in other members of the deer family, they are solid bony growths that are shed once a year—usually in early spring. About two weeks after they are lost, a new set begins to grow from the round bumps on the animal's head.



Elk, or Wapiti



Caribou

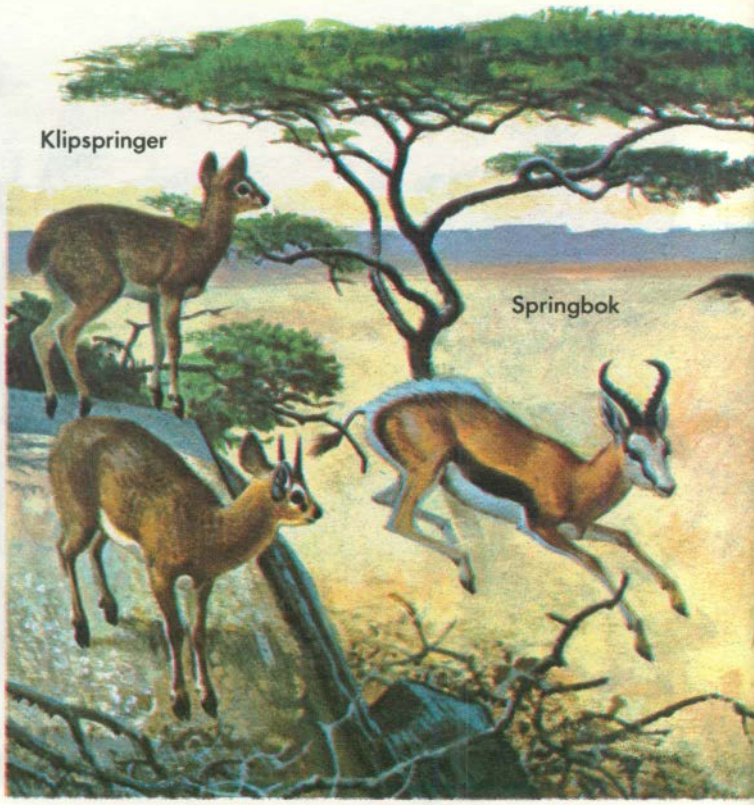
During the courtship season, males rush toward each other, their antlers crashing noisily when they strike together. Those spectacular battles between bull elks take place in autumn, and they begin when the bulls give out loud, buglelike calls to announce their claim to a territory.

Seldom, if ever, is blood drawn in these fights. But a bull much larger than the other may break his opponent's neck by the sheer force of the impact. There are records, too, of the animals having got their horns interlocked. Unable to separate, they have died of starvation, leaving their locked horns to tell the tale of the tragedy.

The smaller caribou, or reindeer, lives farther north than any other hoofed mammal except the musk-ox. Herds of caribou range over the treeless Arctic tundra, where they feed mainly on reindeer moss. In the winter, this source of food is hidden under the snow. The caribou then migrate southward into the timbered area, where it is easier to find food.

The fleetest of the hoofed mammals are the various kinds of antelopes, of which there are more than 70 species. They are closely related to cattle, goats, and sheep. Antelopes are the typical herding animals of the grasslands of Africa and Asia. Some have small, spike-like horns. Others, such as the black buck of India and the kudus and gazelles of Africa, have long, curved, or even cork-screw-shaped horns. The horns of the deer are solid, but those of the antelopes are hollow.

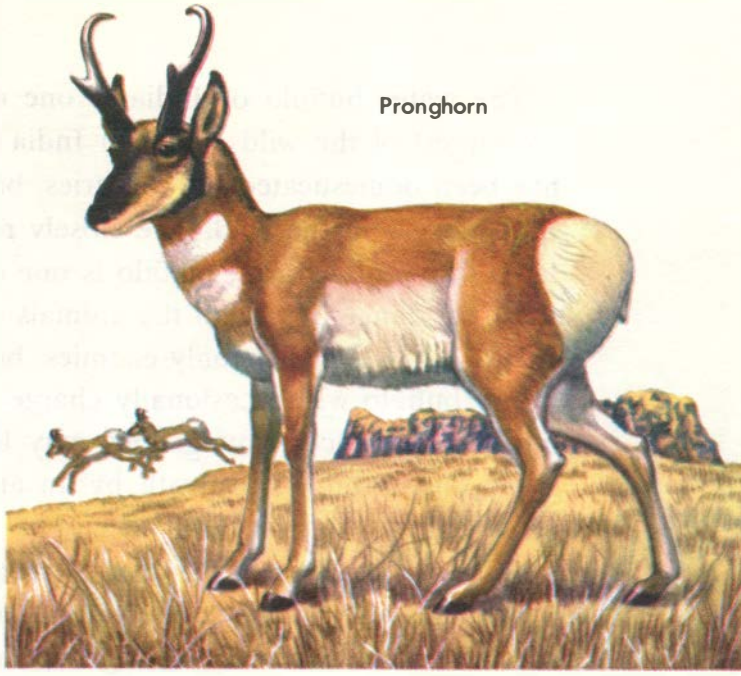
All of the antelopes are swift runners. Some kinds, notably the klipspringers and the springboks, can also leap very high. Gnus, or wildebeests, are unusual African antelopes with horns that curve outward like formidable hooks. They have thick growths of chin whiskers and full tails, like horses'. Like other antelopes, gnus travel in herds that are commonly made up of several species.



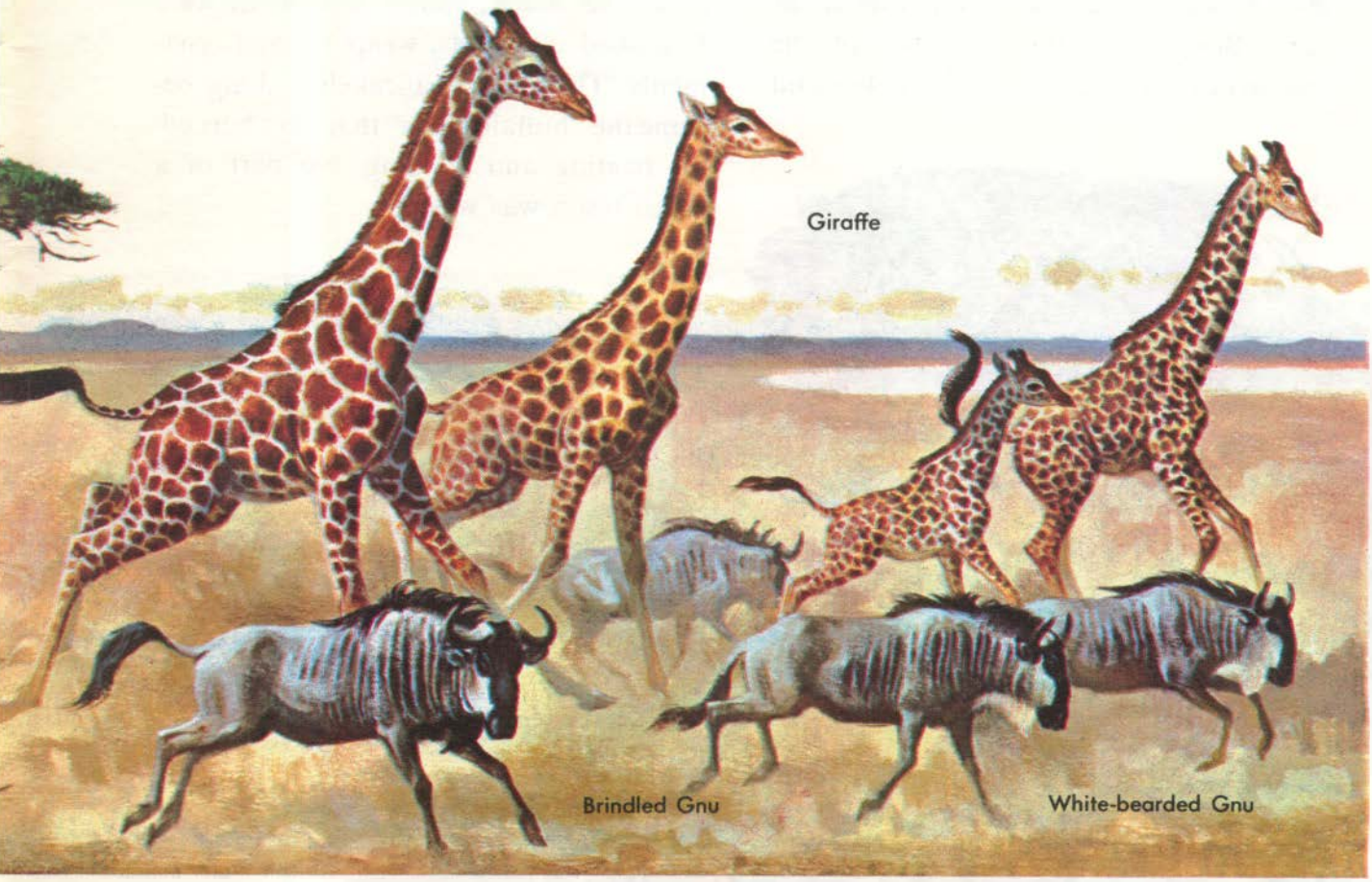
Klipspringer

Springbok

Pronghorns of the American West are sometimes referred to as antelopes, but they are not really close relatives. They do resemble antelopes in size and in habits, however. Their unusual horns consist of matted growths of hair, and they are shed every year. Pronghorns are the swiftest animals in North America. Their top speed is about 40 miles per hour, but they can run at 30 miles per hour for many miles to outdistance any pursuer.


Pronghorn

The most ungainly of the hoofed mammals in appearance are the African giraffes. A giraffe may stand as much as 18 feet tall, a third of its height consisting of its long neck. Its hind legs are much shorter than its front legs so that the animal slopes sharply downward from its head to its tail. Because of their height, giraffes can browse easily on the tender leaves of tall trees. But to drink or to feed on ground plants, a giraffe must spread its front legs and bend its head down awkwardly. A giraffe usually sleeps standing up. This is easier than going through the effort of getting up from a reclining position.


Giraffe
Brindled Gnu
White-bearded Gnu

The water buffalo of India is one of the largest of the wild cattle. In India it has been domesticated for centuries, but it also exists in the wild. The closely related Cape, or African, buffalo is one of the most dangerous of all the animals in Africa. Lions are their only enemies, but a bull buffalo will occasionally charge a lion. Inexperienced young lions may be gored and trampled to death by an angered bull.

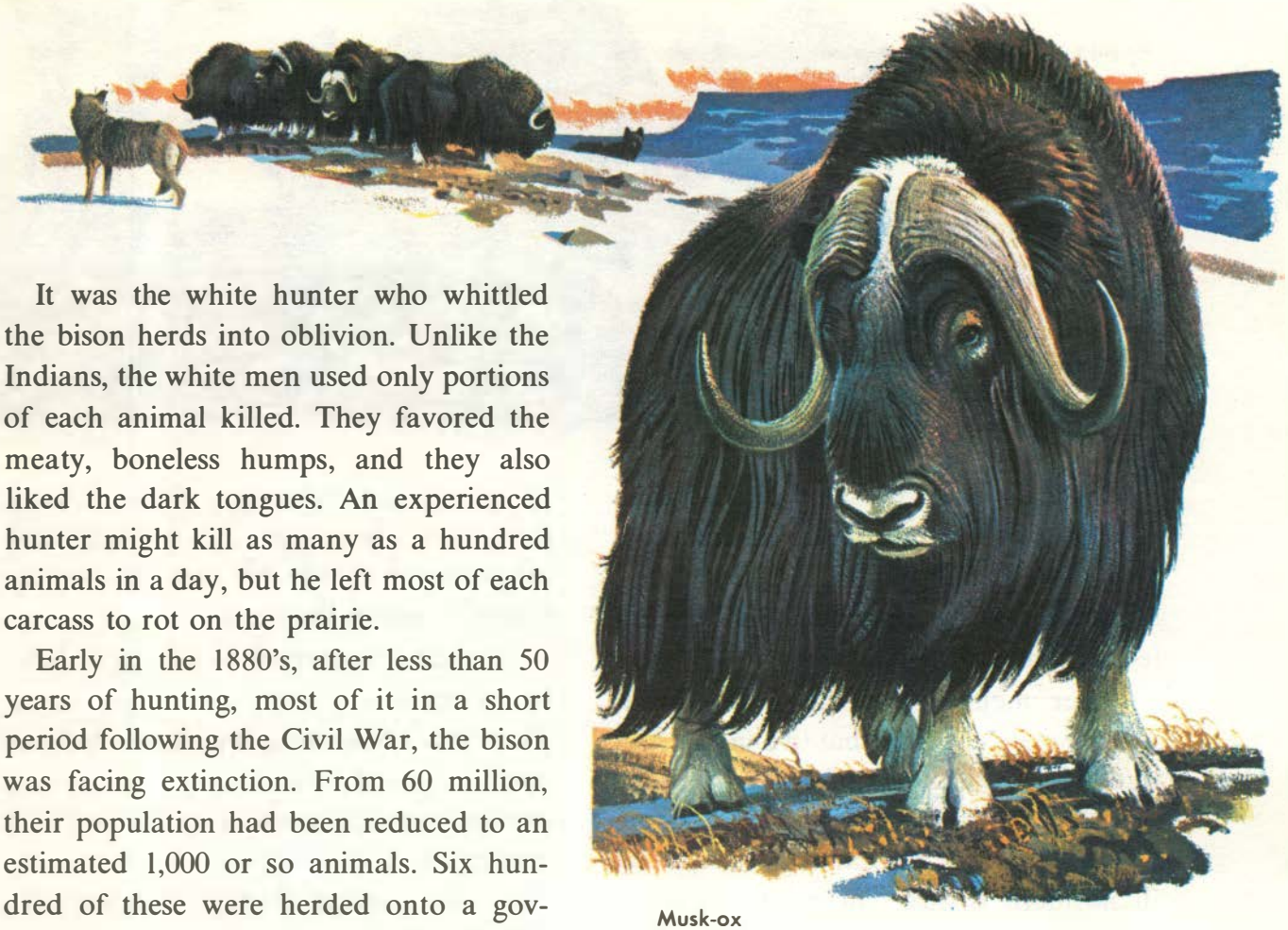
Bison, or buffalo, of the North American plains also belong to the cattle family. All the members of this group are grazers, and to survive in numbers, they need large amounts of space.

Bison

Once, for example, the vast grasslands forming the heartland of North America were the home of an estimated 60 million bison. The bulls were magnificent, shaggy beasts, weighing more than a ton and measuring six feet tall at the shoulders. Bison were the mainstay of the Indians that also lived in this treeless and largely waterless land. Bison ate the grass. Indians ate the bison. They also turned their tough bison hides into garments or stretched them over poles to make shelters. The bones, horns, and teeth were fashioned into tools, weapons, and ornaments. The dried, pancakelike dung became the "buffalo chips" that were burned for heating and cooking. No part of a killed bison was wasted.

Indian Water Buffalo

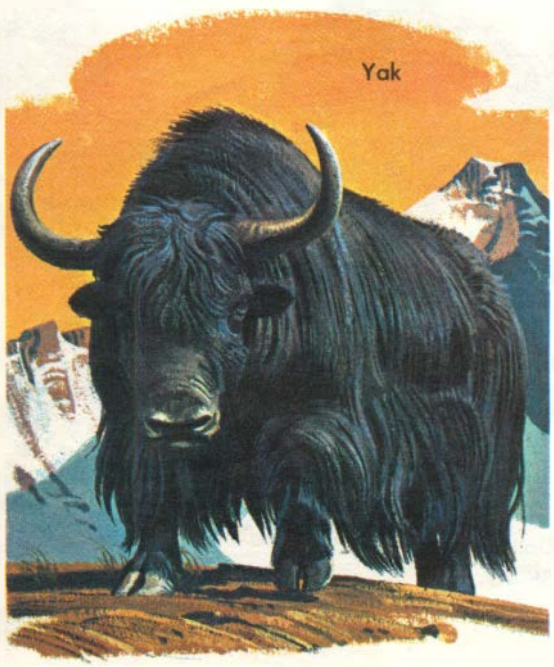
African Water Buffalo



Musk-ox

It was the white hunter who whittled the bison herds into oblivion. Unlike the Indians, the white men used only portions of each animal killed. They favored the meaty, boneless humps, and they also liked the dark tongues. An experienced hunter might kill as many as a hundred animals in a day, but he left most of each carcass to rot on the prairie.

Early in the 1880's, after less than 50 years of hunting, most of it in a short period following the Civil War, the bison was facing extinction. From 60 million, their population had been reduced to an estimated 1,000 or so animals. Six hundred of these were herded onto a government reservation. There, fortunately, they bred and prospered. Small herds are kept today on a number of similarly managed lands, and their numbers are kept in check by controlled harvests.



The yak and the musk-ox are two members of the cattle family that have adapted to harsh, cold lands. The yak lives in the cold highlands of Tibet. These animals have been domesticated and are the main source of meat and milk for the people of Tibet. They are also used by them as beasts of burden.

The musk-ox lives in northern Canada and Greenland. Like the yak, it has a long, shaggy coat that protects it from rain, snow, and the bitter cold. When attacked by wolves, musk-oxen form a defensive circle, with the calves inside. The musk-oxen keep their heads pointed toward the attacking wolves. The wolves know that the sharp hooves and horns are dangerous weapons, and they stay a safe distance away. Attempts to domesticate the musk-ox have not been successful.

Mountain Goat

Mountain goats live in western North America. These shy animals belong to the cattle family, but they are not true goats. Mountain goats are excellent climbers and feel at home in high places.

Other members of the cattle family are the agile chamois that live in the Alps and the several kinds of wild sheep and goats of North America and Europe.

The aoudads, or Barbary sheep, live in northern Africa. These long-bearded, long-horned sheep are often found in zoos. Bighorns and Dall's sheep of North America are notably agile in scaling rocks and in leaping from one craggy prominence to another. Like other members of the group, they have scent glands in their front feet. These leave a scent trail that other members of the herd can easily follow to rejoin the herd.

Like other members of the cattle family, sheep and goats have hollow horns. They also chew cuds, which are balls of partly digested food coughed up from a storage stomach, chewed at the animal's leisure, and then swallowed again to complete the passage through the animal's digestive tract.

Bighorn, or Mountain Sheep

Aoudad, or Barbary Sheep

Dall's Sheep

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